FACTORY

MANAGEMENT AND MAINTENANCE

OCTOBER 1946

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What the Factory Worker Really Thinks

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Three-Form Cost Control in Maintenance

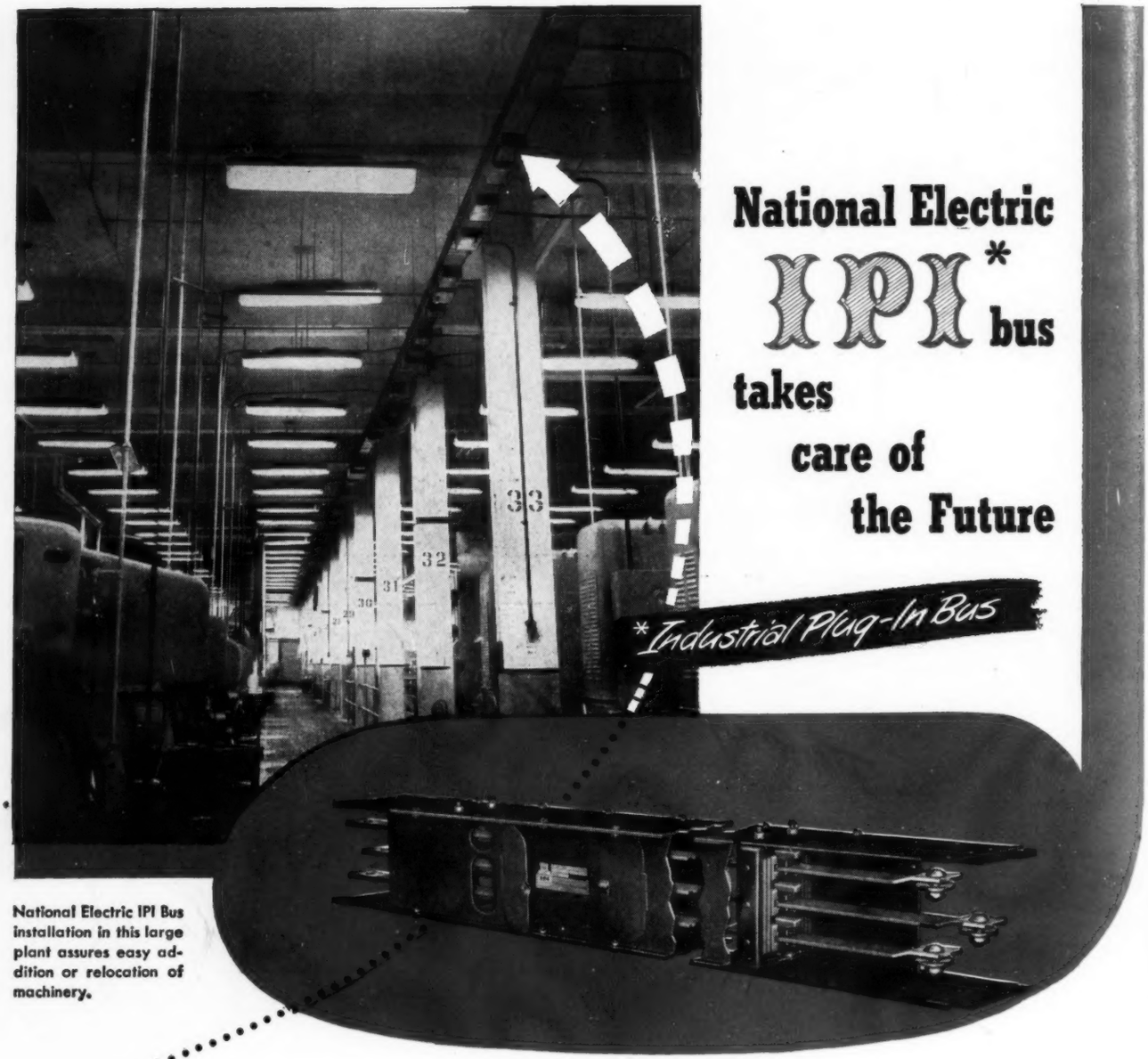
Chose High-Tension Service to Solve Power Problem

LABOR-MANAGEMENT

Job and Merit Rating Stopped Wage Squabbles

Multiple Management—a Tool to Stimulate Productivity

FOR COMPLETE LIST OF ARTICLES SEE PAGE THREE



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production • maintenance • labor management

A FREE ECONOMY IS WORTH FIGHTING FOR *preceding page* 81
WHAT THE FACTORY WORKER REALLY THINKS—1. ABOUT LIVING COSTS, WAGES, AND STRIKES 81
EDITORIALS 89
AIR CONDITIONING SYSTEMS ARRANGED FOR EASE OF UPKEEP 90
MASS METHODS MADE FEASIBLE BY SPECIAL LIFTING AIDS 94
THREE-FORM CONTROL IN MAINTENANCE 98
GIVE WORKERS THE COMMON-SENSE FACTS BEHIND THEIR JOBS 100
LOWER BATTERY COST BY BETTER CHARGING 104
THREE-POINT PROGRAM FOR PRODUCTION CONTROL 106
PLANNING GETS MAINTENANCE WORK DONE ON TIME 110
STANDARDIZED HOPPERS 113
CHOSE HIGH-TENSION SERVICE TO SOLVE POWER PROBLEM 116
A SIMPLE WAY TO FIGURE MACHINE DOWNTIME 118
SETTING WORKER-NORMALS FOR TIME STUDY PURPOSES 122
WAGE AND MERIT RATING STOPPED WAGE SQUABBLES 127
NEMA SETS NEW STANDARDS FOR FRACTIONAL HORSEPOWER MOTORS 131
GOOD ORGANIZATION ASSURES SAFETY PLAN'S SUCCESS 132
FACT-FINDING IS NOT A CURE-ALL FOR LABOR DISPUTES 134
STORAGE THAT MEANS NO WAITS FOR PARTS 137
FORK TRUCKS FOR HEAVY HANDLING 138
CAFETERIA A BIG FACTOR IN LOWERING COSTS 140
CORRECT ELECTRICAL EQUIPMENT MINIMIZED EXPLOSIVE HAZARDS 142
MULTIPLE MANAGEMENT—*Plant Operation Library No. 98* 145
FIVE SAFETY COMMITTEES FOR BETTER MAINTENANCE 153
NEW PLANT LAID OUT FASTER AND SURER WITH MODEL 156
WHAT'S AHEAD IN LABOR 158
WHAT'S AHEAD IN BUSINESS 159
HOW CIO AND AFL STAND ON CURRENT ISSUES 286
DO'S AND DON'T'S FOR ORDER-PLACERS 294

departments

OPERATING SHORTS (*outstanding methods briefly reported*) 160
MATERIALS HANDLING EQUIPMENT REVIEW—II 166
WHAT'S NEW IN EQUIPMENT 172
YOU WANT TO KNOW 228
SIGNIFICANT LABOR DEVELOPMENTS 236
THEY SAY AND DO 264
BEHIND THE BYLINE (*facts about* FACTORY'S *authors*) 276
BOOKS AND BOOKLETS 306
ON THE CALENDAR (*national meetings for plant operating men*) 312
CATALOG SERVICE (*announcements of manufacturers' literature*) 322

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A FREE ECONOMY IS WORTH FIGHTING FOR

BUSINESS must take the initiative if the price decontrol machinery, set up by Congress, is to be effective. The present price control law is far more than a set of instructions to the administrators of OPA; it is a challenge to business to be aggressive in speeding decontrol decisions and in persuading the Price Decontrol Board to adopt a strong stand for return to a free economy.

Thus far business has not met this challenge. *Two months after the passage of the new price law not a single application for decontrol of a major product had been filed by an industry advisory committee.* This is due in part to the red tape controlling such applications. Nonetheless, a continuation of such inactivity on the part of business can well result in perpetuating price control far beyond the time either the present law or sensible economic policy require.

It was the clear intent of Congress to hasten our return to a free economy. In the legislation continuing the general control of prices, Congress formally declared its purpose to have it "terminated as rapidly as possible."

To accomplish this, the House originally approved a formula which would have made decontrol mandatory when production had attained a prescribed level. The automatic decontrol provision was dropped before the bill was finally passed, partly because of the uncertain effects of strikes on production. But Congress did not mean to return the timing and extent of decontrol to the administrative discretion of OPA.

On the contrary, to assure having price control "terminated as rapidly as possible," Congress created a Price Decontrol Board and gave it power to overrule OPA when the board finds price control should be removed. Moreover, it gave to industry the right and the responsibility to seek decontrol. Also, in a further effort to speed up the decontrol process, it placed narrow limits on the time allowed for board decisions.

Congress had compelling economic reasons for doing its legislative best to speed up decontrol.

1. It is by all odds the best way to eliminate the bottlenecks in production and the black markets which have plagued the country since V-J Day.

   Rigid price ceilings promote shortages of badly needed commodities by discouraging their production. Such shortages both upset the flow of production and promote black markets. At present a considerable part of American industry is stymied by shortage of critical parts and materials. Price control is much to blame.

2. There must be flexibility of prices if a round of new wage adjustments, which may be forced on industry early in 1947, is to be negotiated without grave risks of seriously curtailing production.

   When, under the leadership of the national administration, the first post V-J Day round of wage adjustments was made, price ceilings were held rigid while wages were boosted. The result was a series of price-wage squeezes which upset production. They would have been disastrous if we had not been in a sellers' market, created by a tremendous accumulation of wartime shortages. In 1947, however, many industries will be in a buyers' market. It must be possible, therefore, to have wage increases reflected promptly in price adjustments if we are to avoid a repetition of the costly post V-J Day round of strikes, which often had price control as the key issue.

3. Rapid decontrol is necessary to maintain a high level of employment and production.

   Almost five years of price control inevitably twisted the factors of production and distribution far out of the equilibrium which would prevail in a free economy to which it is the clear purpose of the nation to return. Unless the return to a free economy is facilitated by a speedy and orderly decontrol, the jolt of an abrupt return to competition can be expected to upset employment and production seriously.

It's Up To Business

To encourage speed and boldness in decontrol, Congress provided for the reimposition of control over any prices which, after being released, might

get out of hand. The dangers of this sort are chronically exaggerated. During the 25-day period in July when there was no price control the Civilian Production Administration found that "manufacturers of finished industrial and consumer products have generally exhibited commendable restraint in increasing prices no more than increased costs."

All of this endeavor to speed up decontrol and expand its scope is likely to be futile, however, unless business furnishes the driving power for the machinery Congress provided. OPA certainly will not do it. Neither can the Decontrol Board be expected to go out and drum up cases.

The necessity for vigorous action by business in pressing for decontrol is increased by the fact that the general legislative standards to guide decisions by the Decontrol Board are vague. They must be clarified and sharpened by decisions in specific cases.

The main principle to guide the decontrol of non-agricultural products is that price ceilings shall be removed when supply is in approximate balance with demand. But what precisely does that mean? The meaning will become clear only through Decontrol Board decisions.

The same is true of the principle which makes automatic decontrol of a non-agricultural commodity contingent on whether or not it "is important to business costs or living costs." Business must press cases which will give specific meaning to those vague terms if decontrol is to get on apace.

Cards Are Stacked

At present the government has the cards pretty well stacked against rapid decontrol.

First, the key members of the staff of the Price Decontrol Board are holdovers from the Bowles regime which emphasized the importance of carrying on price control rather than speed in getting rid of it.

Second, in exercising his authority to prescribe regulations to govern petitions for decontrol, the OPA administrator has required excessively complicated statistical and economic data. Manufacturers who are sure they can convince any fair-minded board of the desirability of decontrolling certain of their products assert that they are blocked by statistical entanglements.

Third, OPA has discouraged business from moving immediately under one section of the law to speed decontrol. This section provides that products "not important in relation to business or living costs" may be freed from price ceilings immediately and must be freed by December 31, 1946, unles OPA specifically finds they are important to these costs. Instead of making it possible for business to move under this section now, OPA has issued rules which have the effect of blocking such a course until the end of the year.

In the light of obstacles such as these, it is not surprising that the record of decontrol to date is not impressive.

Decontrol Record

Since June 30 there has been a drop from about 70% to about 60% in the total value of products under price control. But most of the drop has been accounted for by food products, which Congress took the lead in decontrolling, and by industrial machinery which was being decontrolled when Congress acted. By far the larger part of manufactured consumer goods remains under control.

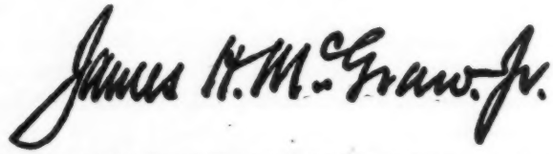
This, however, is no time for business to be discouraged. Rather, business should accept the obstacles put in its way as a challenge and work harder than ever for speedy decontrol.

The case for decontrol should not be stated in narrow technical terms. It should be based on grounds of broad public policy, and should demonstrate how a speedy return to a free economy can hasten the full release of the nation's productive power.

For example, there should be very clear demonstrations of how, in far too many cases, rigid price ceilings—(1) discourage production of key parts and materials by making such production relatively unprofitable, (2) create shortages of key parts and materials which tie up broad ranges of production or result in piling up lopsided inventories of partially completed goods, and (3) thus cut away the foundations of a stable economy and the prospects of steadily sustained employment.

There should be equally full demonstrations of the well known sequence from shortages to unrealistic price ceilings to black markets. Meat prices are rolled back, but the meat is rolled under the counter.

A free economy is worth fighting for. Liberty is preserved only by the constant struggle of those who believe in it. Neither the interests of the nation in a strong and well-balanced economy nor the interests of business itself will be served by drifting at this time. Now is the time for business to lead a strong offensive for speedy elimination of price control.



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THIS IS THE 51st OF A SERIES

FACTORY
MANAGEMENT AND MAINTENANCE
A McGRAW-HILL PUBLICATION

october, 1946

what the factory worker really thinks

about the cost of living, wages, and strikes

FACTORY'S THIRD ANNUAL SURVEY **of the opinions of workers in manufacturing industries shows that workers believe:**

- **The rising cost of living will force a second round of wage increases**
- **Industry can afford wage increases now without increasing prices**
- **Workers will strike unless industry gives wage increases**

Results of the nation-wide survey reveal much that will guide management in meeting problems ahead

This is the first of two articles. The survey was conducted for FACTORY by the McGraw-Hill Research staff, making use of the most modern methods of the sampling technique to determine group opinion. FACTORY believes the survey is representative of factory employee opinion throughout the nation.

summary of worker opinion

on the cost of living

1. The worker says the cost of living has gone up 20 to 30 percent since the end of the war
2. He blames shortages, high wages and high prices, and the OPA
3. He blames shortages on people holding back for higher prices
4. He thinks low production is caused by shortages of materials and strikes
5. He believes workers can help to stop inflation by helping to increase production and by not striking . . . and he thinks getting to work and increasing production will do the most to bring prices down again

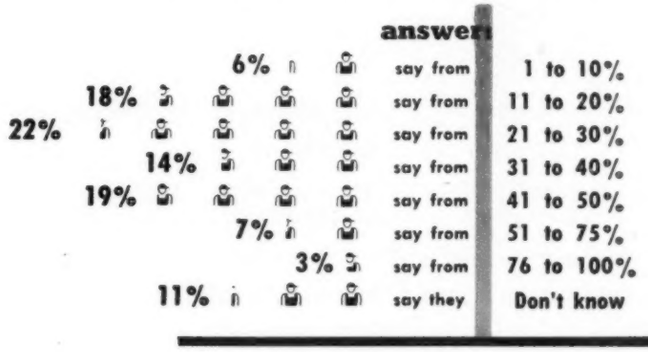
on wages and strikes

6. The worker thinks industry can grant wage increases now without raising prices . . . he thinks a 10 percent wage increase is possible . . . he is sure his own company can afford wage increases
7. He believes workers will strike if industry does not give an increase . . . but he is not so sure that *he* would strike . . . non-union, older, and Southern workers and independent union members are less inclined to strike
8. He thinks there are more strikes, not fewer, ahead . . . but he's not as certain of it as he was a year ago . . . and the cost of living will be the chief cause of strikes
9. If he has taken part in a strike since the end of the war, he is of two minds as to whether it was worth the sacrifice . . . but he doesn't believe that he could have gotten the same benefits without striking

what the factory worker really thinks ABOUT THE COST OF LIVING

1. the worker says the cost of living has gone up 20 to 30 percent since the end of the war

QUESTION: *How much do you think the cost of living has gone up for your family since the end of the war?*


answers:
6% say from 1 to 10%
18% say from 11 to 20%
22% say from 21 to 30%
14% say from 31 to 40%
19% say from 41 to 50%
7% say from 51 to 75%
3% say from 76 to 100%
11% say they Don't know

2. he blames shortages, high wages and high prices, and the OPA

QUESTION: *In your opinion, what is the cause for the increase in the cost of living?*

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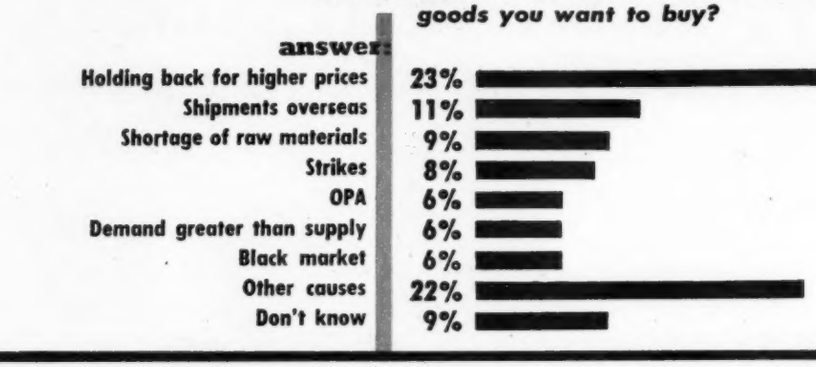
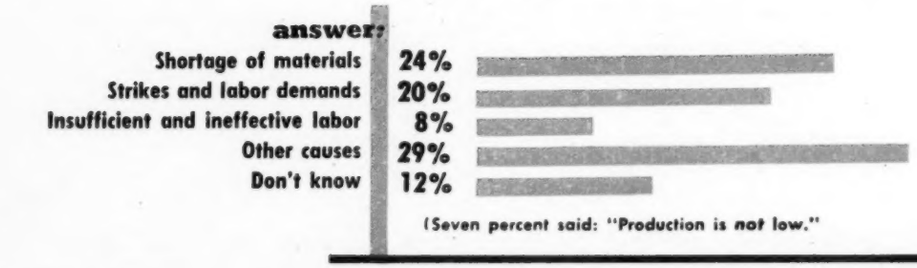
3. he blames shortages on people holding back for higher prices

QUESTION: *What is the chief cause of shortage in the goods you want to buy?*



4. he thinks low production is caused by shortages and strikes

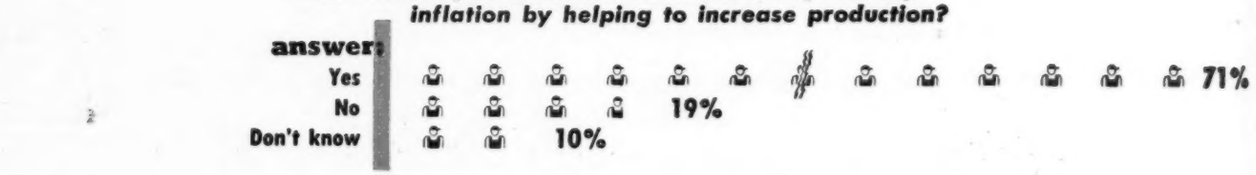
QUESTION: *What is the chief cause of low production today?*



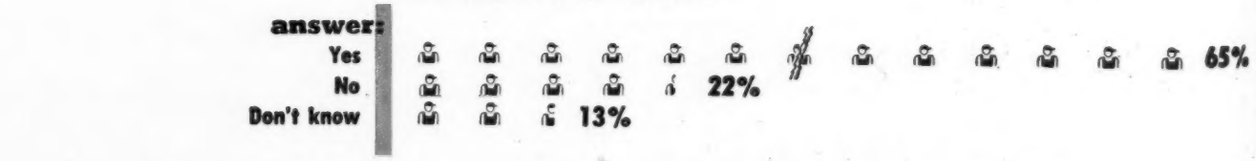
(Seven percent said: "Production is *not* low."

5. he believes workers can help to stop inflation by helping to increase production and by not striking . . .

QUESTION: *Do you believe workers can help to stop inflation by helping to increase production?*

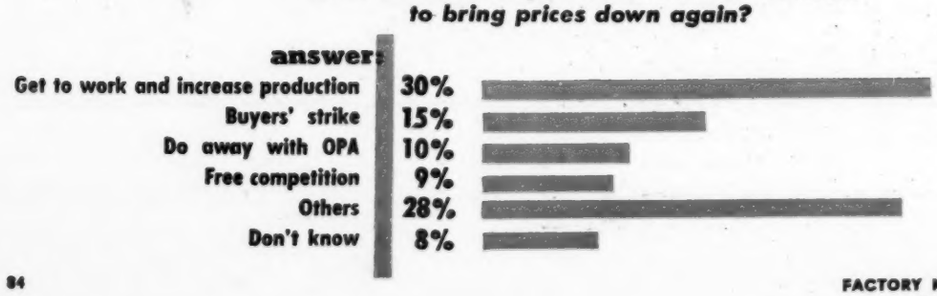


QUESTION: *Do you think workers by not striking can help to stop inflation?*



. . . and he thinks getting to work and increasing production will do the most to bring prices down again

QUESTION: *What do you think will do the most to bring prices down again?*



despite the Bureau of Labor Statistics index, which shows a rise in the cost of living of 11 percent between August, 1945, and August, 1946, the worker believes his cost of living is up about 30 percent.

His reasons for higher living costs are pretty much the same whether he's CIO, AFL, member of an independent union, or non-union. Shortages is the first reason given by each group. High wages is the second important reason according to 12 percent of CIO members, 10 percent of AFL members, 7 percent of independent union members, and 11 percent of non-union workers.

comment

That workers can help to stop inflation by not striking is the conviction of 60 to 65 percent of the members of each union group; however, in plants of less than 100 employees, 71 percent of the workers say "yes," while only 63 percent of large-plant workers agree.

Increasing production will help to stop inflation, according to 76 percent of AFL members and 66 percent of CIO members. But only 58 percent of workers in New England plants agree. The conviction that increasing production is the answer to inflation is stronger in the West, where 82 percent of the workers agree.

Because the cost of living issue is certain to be a pivotal point in collective bargaining in the months to come, these attitudes are significant for both management and labor leaders. The fact that many workers believe that increasing production is the answer to high prices may also mean that output per manhour will begin to rise.

There is meat for lawmakers, too, in these worker attitudes. When asked what will do the most to bring prices down again, only 5 percent say controlling prices. And only 5 percent ask for a stronger OPA. A mere 1 percent think profits should be controlled.

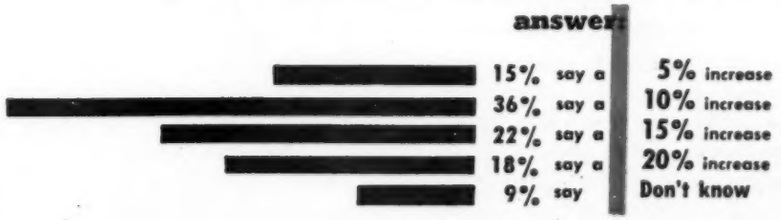
what the factory worker really thinks ABOUT WAGES AND STRIKES

6. the worker thinks industry can grant wage increases now without raising prices . . .

QUESTION: *Do you think that industry could give workers a wage increase now without raising prices?*

. . . he thinks a 10 percent wage increase is possible . . .

QUESTION: *About how much of an increase could industry pay?*
(Asked only of those who thought industry could raise wages)



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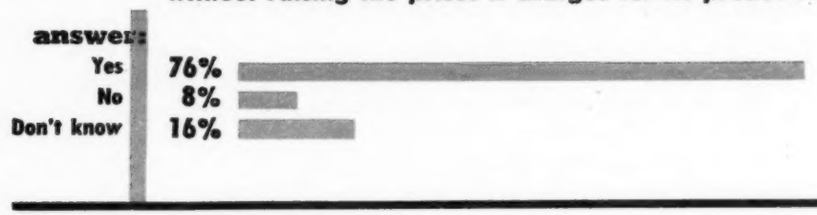
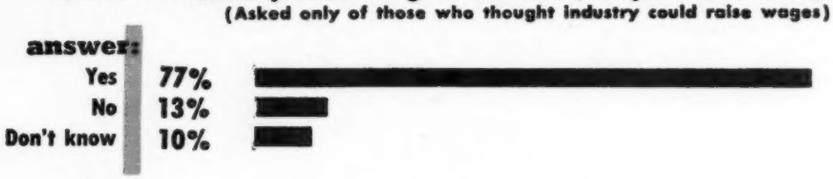
. . . he is sure his own company can afford wage increases

QUESTION: *Could your own company give workers a wage increase without raising the prices it charges for its products?*



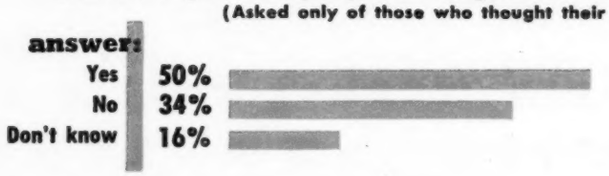
7. he believes workers will strike if industry does not give an increase . . .

QUESTION: *If industry does not give increases, do you think workers will strike?*
(Asked only of those who thought industry could raise wages)



. . . but he is not so sure that he would strike . . .

QUESTION: *If your company did not give increases, would you vote to strike?*
(Asked only of those who thought their company could raise wages)



. . . non-union, older, and southern workers and independent union members are less inclined to strike

Here are the percentages of workers who said they would vote to strike as broken down by area, age, and the union affiliation of the worker:

by area:		by age:		by union affiliation:	
New England	51%	20-34 years	49%	CIO	60%
Middle Atlantic	54	35-54 years	53	AFL	57
East North Central	45	over 55	39	Independent	44
South	42			All union members	57
West	59			Non-union	27

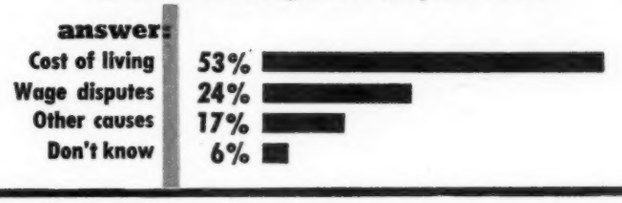
8. he thinks there are more strikes, not fewer, ahead . . . but he's not as certain of it as he was a year ago . . .

QUESTION: *During the next year or two, do you think there will be more strikes or fewer strikes?*

	answer-1946	answer-1945
More strikes	43%	74%
Fewer strikes	31	11
No difference	12	6
Don't know	14	9

. . . and the cost of living will be the chief cause of strikes

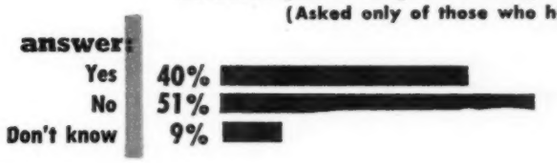
QUESTION: *What do you think will be the chief cause of strikes during the next year or so?*



9. If he has taken part in a strike since the end of the war, he is of two minds as to whether it was worth the sacrifice

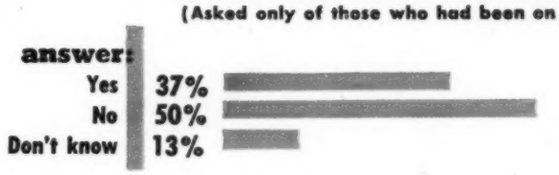
QUESTION: *Have you taken part in a strike since the end of the war?*

QUESTION: *Do you believe the benefits you got were worth the sacrifices you and your family made during the strike?*
(Asked only of those who had been on strike)



. . . but he doesn't believe that he could have gotten the same benefits without striking

QUESTION: *Do you believe that you could have gotten the same benefits without striking?*
(Asked only of those who had been on strike)



comment

Industry can give workers wage increases now without raising prices, say substantial majorities of every group of workers—union and non-union, members of AFL, CIO, and independent unions, younger workers and older, men and women, small-plant and large-plant employees. Belief in industry's ability to absorb still more wage costs is highest in New England, 72 percent of workers there responding "yes" against only 58 percent of Western workers.

These conclusions are in sharp contrast to the worker's understanding of the causes of high living costs and to his desire to increase production to bring prices down again. They may reflect the Administration's post-war encouragement of wage increases without price increases. They certainly reflect management's failure to give employees enough information about their company's finances and the basic economics of their jobs.

The worker's conviction that there will be strikes unless industry gives wage increases, reflects the pressure on him of rising living costs and the statements of union leadership.

Of the 19 percent of workers interviewed who had been out on strike since the end of the war, 51 percent were on strike more than 45 days. This is not necessarily the same 51 percent who think that the benefits of striking were not worth the sacrifice, but the length of time lost from work undoubtedly affects the workers' attitude toward strikes.

FACTORY's second annual survey (FACTORY, December, 1945) proved the worker to be a prophet when 74 percent said there would be more strikes in the next year or two. The fact that only 43 percent now believe there will be more strikes does not necessarily mean that the inclination to strike is down, however. Last year's survey, made after the end of the war, came when the number of strikes had been low. This year has seen a record number of strikes.

Despite that high number of strikes, many workers expect still more in the year or two ahead.

CONTINUED ON NEXT PAGE

probing deeper into what the worker thinks

To throw more light on the meaning of worker attitudes reported in this survey, FACTORY breaks down workers' responses here to show the most significant variations on key questions

non-union workers are against striking

The percentage of "yes" responses on questions on which attitudes varied most when broken down by union and non-union workers

	UNION	NON-UNION
Not striking will help stop inflation?	62%	70%
Can industry give wage increases?	69	56
Will workers strike?	80	70
Would you strike?	57	27
Have you been on strike?	25	8
Were gains worth sacrifice?	43	20
Possible to get gains without strike?	33	61

independent union members are less inclined to strike

The percentage of "yes" responses on questions on which attitudes varied most when analyzed by union affiliation

	CIO	AFL	IND
Increasing production stop inflation?	66%	76%	71%
Not striking will help stop inflation?	60	65	65
Can industry give wage increases?	72	68	64
Would you strike?	60	57	44
Have you been on strike?	32	20	8
Were gains worth sacrifice?	43	44	29
Possible to get gains without strike?	33	27	72

western state workers most apt to strike

The percentage of "yes" responses on questions on which attitudes varied most when analyzed by geographic areas

	NEW ENGLAND	MIDDLE ATLANTIC	EAST NORTH CENTRAL	SOUTH	WEST
What will bring prices down?					
a. Go to work, increase production	24%	31%	29%	30%	41%
b. Buyers' strike	21	14	14	15	11
Increasing production stop inflation?	58	71	71	70	82
Not striking will help stop inflation?	50	64	65	69	69
Can industry give wage increases?	72	65	69	62	58
Will workers strike?	75	84	78	66	73
Can your company give wage increases?	80	76	73	75	80
Would you strike?	51	54	45	42	59
Will there be more strikes?	55	44	41	41	40
Have you been on strike?	23	20	26	9	15
Were gains worth sacrifice?	46	33	40	52	42
Possible to get gains without strike?	11	43	36	44	38

fewer small plant workers believe industry can boost pay

The percentage of "yes" responses on questions on which attitudes varied most when analyzed by size of plant

	LESS THAN 100	OVER 100 WORKERS
Not striking will help stop inflation?	71%	63%
Can industry give wage increases?	59	66
Can your company give wage increases?	69	78
Have you been on strike?	10	22
Were gains worth sacrifice?	59	38
Possible to get gains without strike?	26	38

Next Month: What the Factory Worker Really Thinks About Union Behavior and Industry Earnings

FACTORY

MANAGEMENT AND MAINTENANCE

L. C. MORROW, Editor

Off With The Controls

Wage and price controls have been given their chance and they have failed. It is true that they were based on expected deflation and we have had inflation. But that does not justify retaining them any more than would failure during deflation.

Some way or other, in an economy of free enterprise —which is to say a capitalistic economy—the old law of supply and demand will have its way. When it does, it gives us regulation by competition, not by government control.

The Wage Stabilization Board has not stabilized wages, and cannot, without the consent of organized labor. The maritime strike affords convincing proof that this is so. Once again, a strong minority from organized labor refused to accept a stabilization decision, and once again the government backed down.

The pattern was already established; this case confirms it. Labor's minorities, when they choose to exercise the economic power of the strike, can get what they want. And that is true whether they are justified in their wants or not.

All that remains for the WSB to do, therefore, is to try to make the wage payer foot the bill. But there is no way to force industry to keep its factories operating at a loss. They will keep open for a time because to do so is less costly than shutting down for what may turn out to be a short period. However, eventually they close, or they get higher prices.

And what then? More wages, of course.

To make up for the ineffectiveness of stabilization, wage and price controls should be removed now. If they are, there will be some very high prices for a while. There will be some squabbling between employer and worker. For a time the public will be the victim, and will pay through the nose for much of what it gets.

But the public is the boss. And after it gets its imperative needs satisfied, it will quickly see that competition and not government control takes over our economy.

From 1923-1933 was a representative period in our history, containing good years, average years, and bad. During that period, all corporations made 4.2 cents profit on the sales dollar. Workers in factories received 40 percent of the value added to materials by manufacture. That is about the way American industry divides its earnings right along.

Spiraling of wages and prices, such as is going on now, can keep on going, but it will not alter the fact that the only source for either profits or wages is the production pie. Call it by any number of dollars, the size of the pie doesn't change when the amount of production doesn't change.

Anyone who really likes pie, and who is going to get 100 percent of any pie he chooses, certainly will pick out the biggest pie he can find. Wouldn't he be silly, then, to pick out a small pie because his share was to be only 40 percent of it, or even only 4 percent?

It's time the government let management and labor get together on the size of pie they are going to make.

Tell Workers About The Company

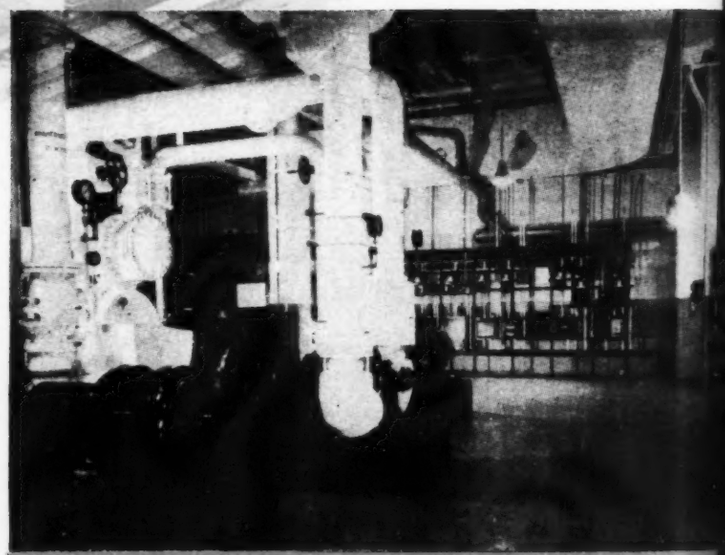
More employers are coming to believe that it pays to work actively to build up a wholesome respect for the company in the community. One necessary procedure is to deal directly with the community in regard to certain matters. Another procedure is to make practical application of the policy that good industrial relations within the plant will make good community relations. Here are examples of what two manufacturers do:

Some weeks ago Manufacturer Number 1 started to use weekly advertisements in the local newspapers specifically to develop a consciousness of the importance of its company to the community and a pride of relationship to the company on the part of employees and their respective families. Reprints of each week's advertisement are mailed to the home addresses of all factory and office executives and employees. Copies of these reprints are posted on bulletin boards in all departments. This manufacturer reports a 90 percent readership on the part of the employee group. The ads in this series deal intimately with the reader in talking about the company and the company's products. In this instance the plant is located in a small city where each citizen knows a great many others.

Manufacturer Number 2 is located in a considerably larger city. At the moment the program of influencing the community is limited to the procedure of dealing directly with employees. The vehicle is the company's advertising just as published in the technical and business press. Reprints of the ads are put on the bulletin boards. To the bottom of each reprint is stapled a message directed to employees explaining why the particular advertisement on display was published. These footnotes convey a great deal of information about the company's products and are designed to stimulate pride in product and company as well as give information concerning them. Here again reports of really worth-while accomplishments are made.

Effective participation in planned programs of community relations are in their infancy. However, interest is increasing rapidly. Indications are that it will be a part of standard procedure within a few years.

Low-cost maintenance of air conditioning equipment in the plants of E. I. du Pont de Nemours & Company is the result of two factors: (1) The equipment was planned and installed for easy, low-cost maintenance; (2) all maintenance is carefully scheduled *and is performed on schedule.* Photographs from many du Pont plants show how it's done



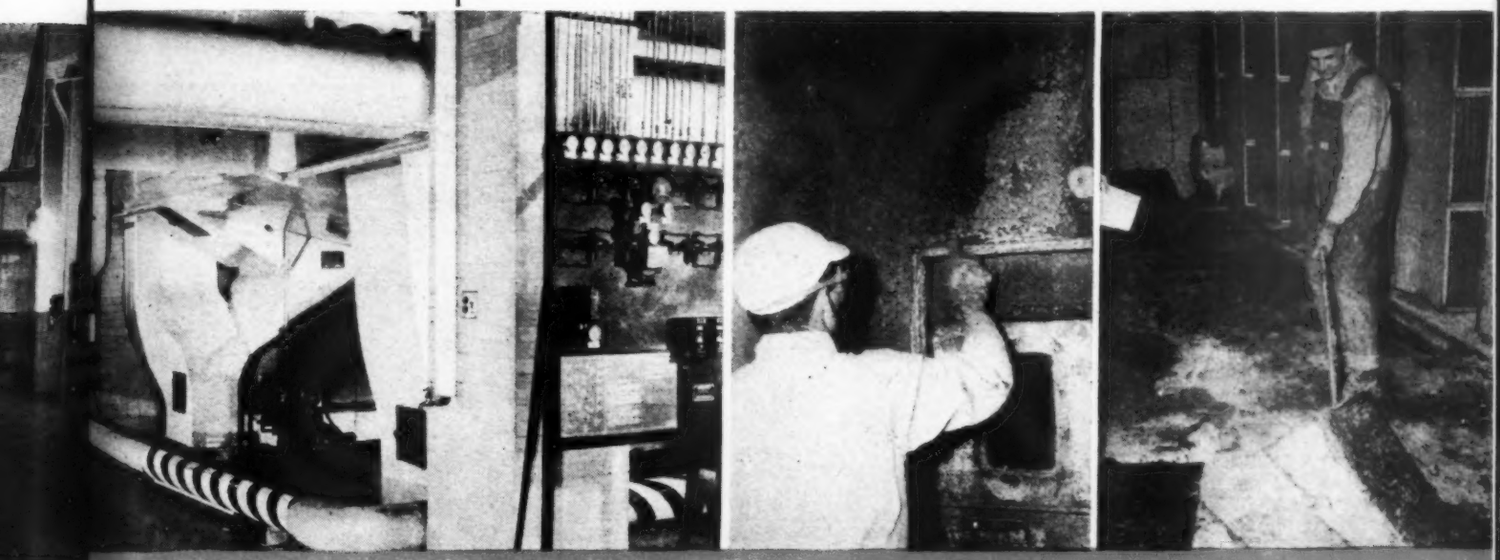
Machinery is located in large, clean, well-illuminated rooms. Control panels are simple and easily accessible; no wiring is exposed. All surfaces are cleaned before priming coat is applied, avoiding early repaint jobs when oil or rust is left on

AIR CONDITIONING SYSTEMS ARRANGED FOR EASE OF UPKEEP

M. G. KERSHAW • ENGINEERING DEPARTMENT, E. I. DU PONT DE NEMOURS & COMPANY, WILMINGTON, DEL.

LUBRICATION TIME-TABLE

Equipment	Name of Part	Lubricant	Amount Used	Frequency	Change Interval	Method of Application
Brine Pump	Bearings	#2 Grease	2 shots	3 months	Yearly	Gun
Ammonia Compressor	Cylinder and Crankcase	#1 Oil	Maintain level	Daily	6 mos.	Circulating
Air Compressor	Crankcase	#2 Oil	Maintain level	Daily	6 mos.	Circulating
Air Compressor	Cylinder	#2 Oil	4 DPM	—	—	Force feed lubricator
Flexible Coupling	Reservoir	#5 Oil	Maintain level	—	Yearly	Oil hole
Water Pumps	Bearings	#2 Grease	2 shots	3 months	Yearly	Gun



Functioning of the entire control system may be watched by studying the performance of the air gages on well-lighted panels. "Floor level" obstructions are clearly marked to prevent accidents

Yearly coat of paint inhibits corrosion—walls need be scraped only every five years. (Right) Floors are mopped with asphalt every year, removed entirely every five years. Membrane base is lapped to hold bulge-causing leaks to a minimum, permit asphalt to be "peeled" off

Water Pumps	Packing	#5 Grease	2 shots	Twice/wk.	—	Compression cup
Fans	Sleeve Bearings	#2 Oil	Maintain level	Weekly	Yearly	Constant level oiler
Fans	Ball Bearings	#2 Grease	4 shots	3 months	Yearly	Gun
Unit Heaters	Ball Bearings	#3 Grease	2 shots	2 months	Yearly	Gun
Motors	Ball Bearings	#2 Grease	2 shots	3 months	Yearly	Gun
Motors	Sleeve Bearings	#2 Oil	Maintain level	Weekly	Yearly	Constant level oiler

CONTINUED ON NEXT PAGE

Temperature control instruments are checked and overhauled once a year. Access doors are of ample size to permit easy passage of workers who wear rubber boots and raincoats, and carry cleaning equipment into wet chambers

Before new floor is applied, sub-floor is burned to remove old coating. Washer-tanks are ¼-in. welded steel plate, not light-gage pans. Buckling of pans, which slowed cleaning and made footing uncertain, is out

Fan housing and rotor are scraped during 5-year overhaul. Drains in fan casings where moisture is present reduce maintenance; housings have large doors to permit quick inspection, ease of access for painting or repairs

KEY POINTS IN MAJOR OVERHAUL OF AIR CONDITIONING EQUIPMENT EVERY FIVE YEARS

ELECTRICAL DEPARTMENT
- Exhaust fan motors
- Supply fan motors
- Spray pump motors
- Electric controls

PIPE DEPARTMENT
- Valves
- Heat exchangers
- Traps

AIR CONDITIONING DEPARTMENT
- Clean:
  - Eliminator plates
  - Ducts
  - Spray nozzles

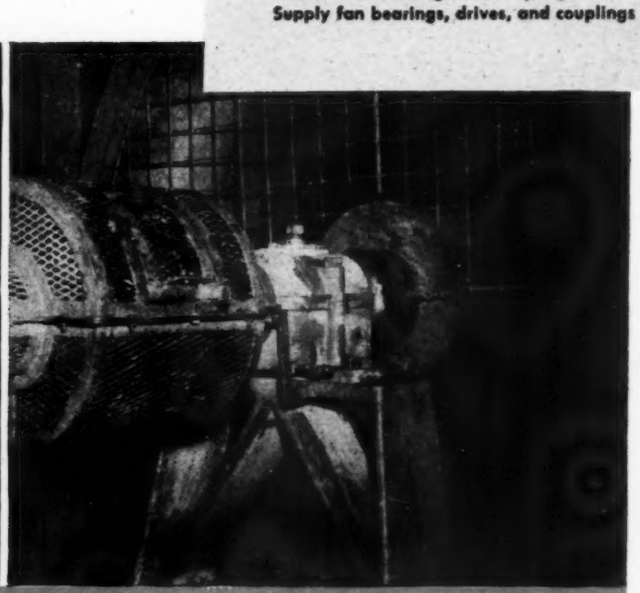
PAINT DEPARTMENT
- Scrape and paint:
  - Fan chambers
  - Spray chambers

MINOR CONSTRUCTION
- Relay floors:
  - Fan chambers
  - Spray chambers
  - Intake chambers
  - Spray tanks

INSTRUMENT DEPARTMENT
- Instruments
- Dampers

MILLWRIGHT DEPARTMENT
- Exhaust fan bearings and couplings
- Supply fan bearings, drives, and couplings
- Spray pumps
- Removing and replacing eliminator plates

Ample space is provided so that when equipment is down for repairs there is place to lay parts. Firm motor foundation reduces vibration



Guards eliminate danger to maintenance crew. Shafts are wrapped with cambric tape to prevent rust entering air stream. Split housings on fans allow removal of wheel and shaft in headroom available

Ducts are cleaned after all other work is completed. Drains are provided on both up- and down-stream sides of air washers, and floors are sloped toward the drain pipes

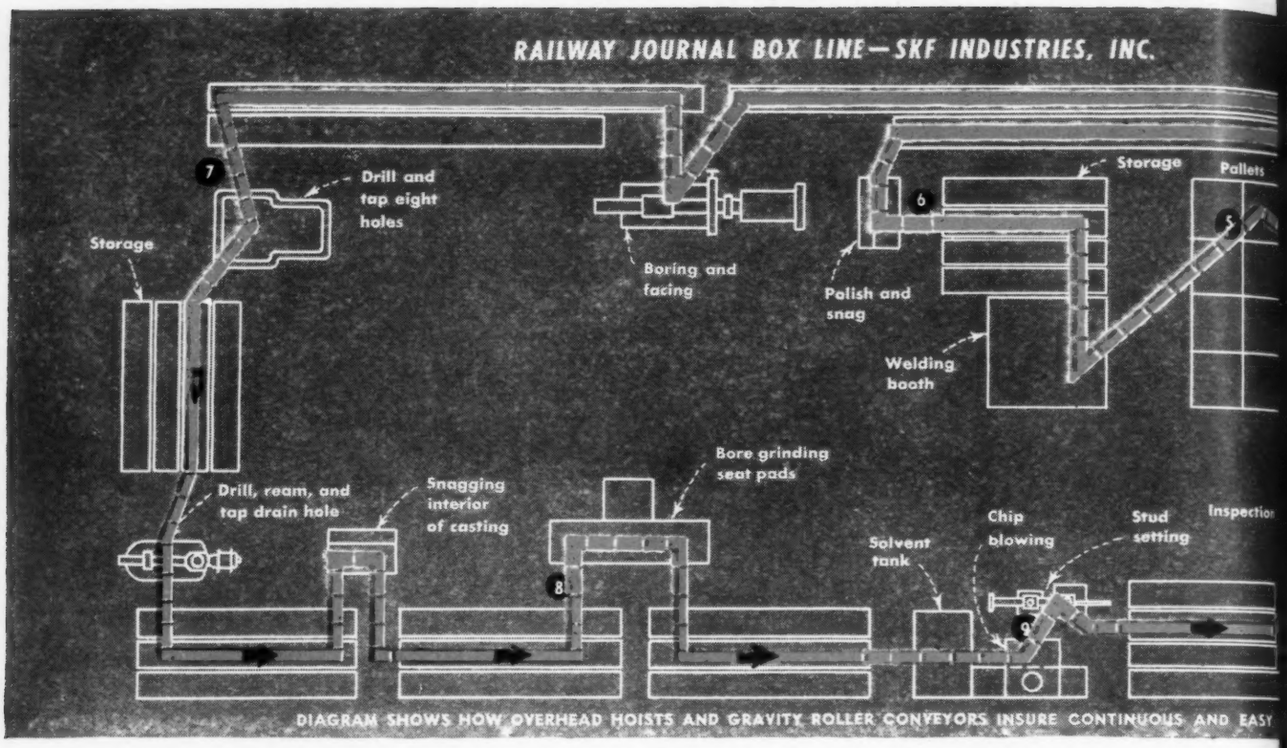


DIAGRAM SHOWS HOW OVERHEAD HOISTS AND GRAVITY ROLLER CONVEYORS INSURE CONTINUOUS AND EASY

Special hooks and tongs play a major role on a production line that went into operation less than 4 months ago at SKF. Used to load heavy castings into machines and to unload finished work, these aids to better handling have been teamed with power hoists and gravity roller conveyors to bring production-line methods to the manufacturer of journal boxes for antifriction bearings for modern railway cars.

Safety, in terms of removing the possibility of dropping castings, has been "designed right into them." Also important, this set-up requires only fifteen operators to man the entire line, and yields much lower unit costs.

Rough castings come to the production line on pallets, delivered at a point near the first cutting operation, which takes place on a double-loading end mill. Half the castings, which are not exactly symmetrical, arrive lug up, the other half lug down, to avoid need for the operator turning alternate boxes. The empty fixture is loaded while the cut is in progress so that the operation is practically continuous.

The overhead electric hoist at this point is free to travel in both directions so that positioning the casting on the machine is rapid and requires little manual effort. Unloading by the same hoist requires only a few feet of travel to a double set of roller conveyors, one each at the ends of the miller. Several dozen boxes can be stored on each conveyor awaiting the following boring operation.

AUTOMATIC TURN OVER

A gate at the end of each conveyor allows the operator to let through only one box at a time to a set of horizontal rollers that form a loading table. Omission of one roller at the end of the loading table allows for tilting the casting so that when it is picked up by the special hook it automatically turns over in readiness for positioning by the hoist in the next operation.

Here, the turret lathe for boring and end-facing unloads to a set of three parallel conveyors to provide storage and transportation directly to the next operation, which is a hydrostatic test for porosity. After this test, certain types of journal boxes have one additional milling operation, others go directly to a welding operation. After polishing and snagging, the castings go by pallet to an adjacent heat-treatment room for normalizing, being stored in the meantime on roller conveyors which deliver to a point near the doorway.

Another roller conveyor provides for return of the castings to a finish boring and facing operation, taking up the slack resulting from the batch-process heat-treatment. This is followed by gang-drilling and tapping eight holes for studs. The fixture for this operation provides the 180-deg. rotation necessary for drilling holes in both sides.

At every position for the remainder of the passage back along the line for a grinding operation, cleaning in a solvent bath, insertion of studs, inspection, and assembly of covers, handling is by a 2-way electric hoist, with travel and storage by roller conveyor.

After spray painting, castings ride through an infra-red dryer on wooden pallets over a chain conveyor geared to proper drying time. From here they are transferred to pallets ready for shipment.

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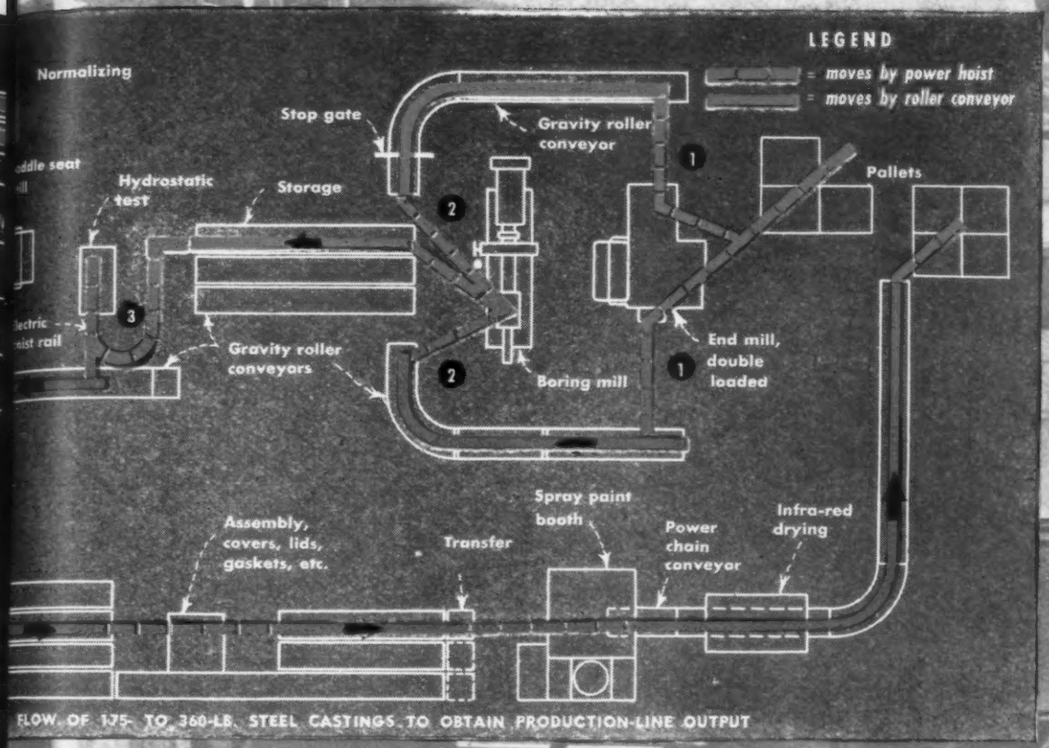
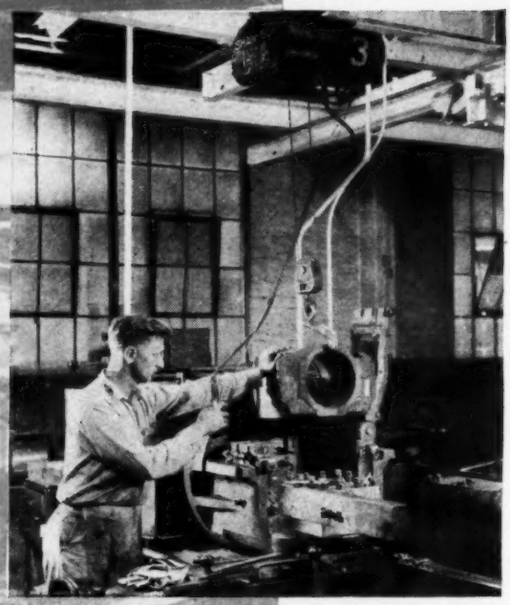


FLOW OF 175- TO 360-LB. STEEL CASTINGS TO OBTAIN PRODUCTION-LINE OUTPUT

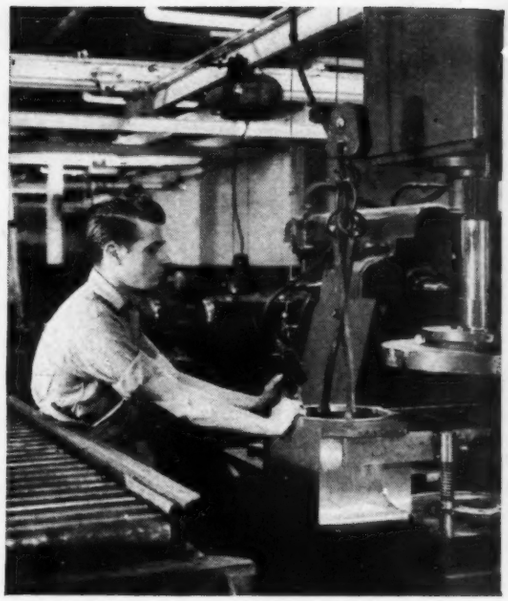
MASS METHODS MADE FEASIBLE BY SPECIAL LIFTING AIDS

E. A. ERICKSON • GENERAL FOREMAN, CAST-IRON DIVISION, SKF INDUSTRIES, INC., PHILADELPHIA

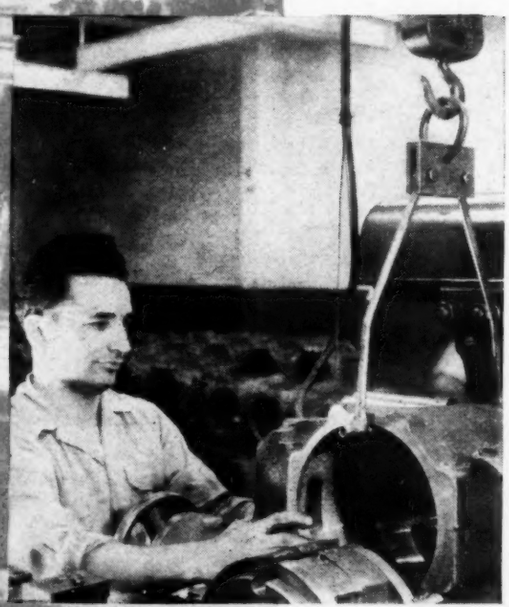
Rough casting is lifted from the pallet by a simple pair of tongs held firmly in position by weight of part. Note two-way travel of hand-controlled overhead hoist



For loading heavy casting into turret-lathe fixture in horizontal position, a reinforced hook neatly balances the casting accurately over vertical slide of fixture. End of the hook is bent so that the casting cannot slide off

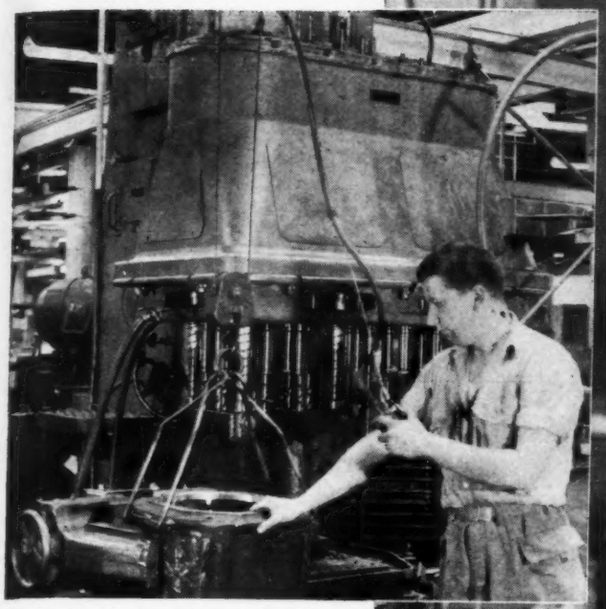


Tongs and hoist lower casting on extension arms of hydraulic testing machine. After the tongs have been removed, part is pushed into test pit by hand along spring-suspended bars which are depressed by upper platen

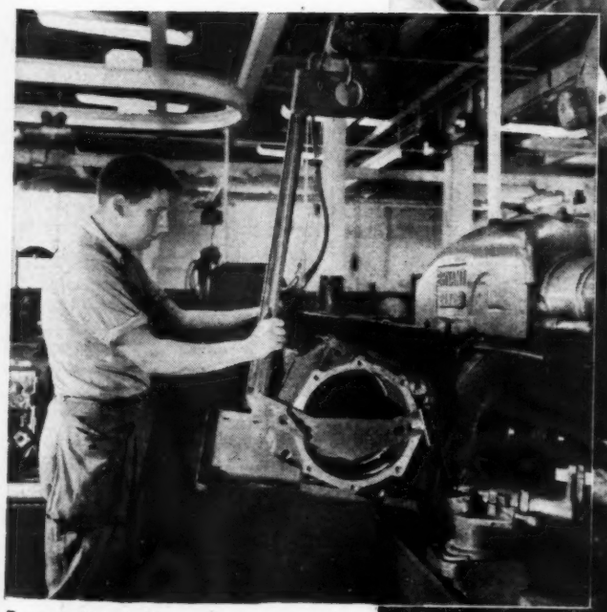


Rod hanger has fingers which extend into central hole about 2 inches. When casting is lowered into fixture, rod ends are removed by a simple sidewise motion through slots made in fixture for that purpose

Rig at snagging table is a simple hook with roller over lifting bar so that casting can be revolved as desired. Note heavy reinforcement and proper balance of hook which makes handling easy in any position



For loading horizontally into fixture on multiple-spindle drill, rod hanger grips only outer side of lugs so that part can slide over arms of fixture



For grinding inside seat pads, casting must be side loaded over a mandrel with only a few thousandths clearance, done by using a balanced frame to which casting is fastened by two hand-screw lugs

To get full 360-deg. rotation in both directions during dipping and cleaning operations, a bar yoke holds casting in any position. Spring stops snap into place automatically, and release by hand

THREE-FORM COST CONTROL IN MAINTENANCE

E. F. SHARPE • PLANT ENGINEER, ILLINOIS TOOL WORKS, CHICAGO

A three-form work order system is used by Illinois Tool Works to control necessary maintenance work and to assure accurate cost records. One form is used for jobs requiring up to 4 hours, another for jobs from 4 to 20 hours, and a third form for jobs requiring more than 20 hours.

The three forms are designed to give complete information about the work to be done, and each must be properly approved. The department requiring the work issues a shop order directly to the maintenance department stating "when" and "how" the job is to be done. Upon receipt of the order the maintenance department determines whether the stockroom has sufficient material to complete the work without delay. If the required material is on hand, the job is then scheduled.

HOW IT WORKS

For example, the maintenance foreman receives order No. 21298 from department 18. The order is issued on the 4-hour form. A stock check shows that a needed part, No. 764321, is on hand. A requisition is made out, and the foreman receives the necessary part.

A man is then selected to do the job, in this case a maintenance electrician. The job is completed in 2.3 hours, which gives a total labor cost of $3.79—using an assumed hourly rate of $1.65. The total material cost is $11.08. The burden or overhead of the departments is assumed to be 100 percent of the labor cost, or an additional $3.79. Total cost for the job is $18.66.

When the work is completed, the total cost of the job is sent to the cost department. There the shop copy is matched with the department copy to see whether the figures are correct. If so, department 15 is charged with $18.66 as operating expense for the particular machine involved.

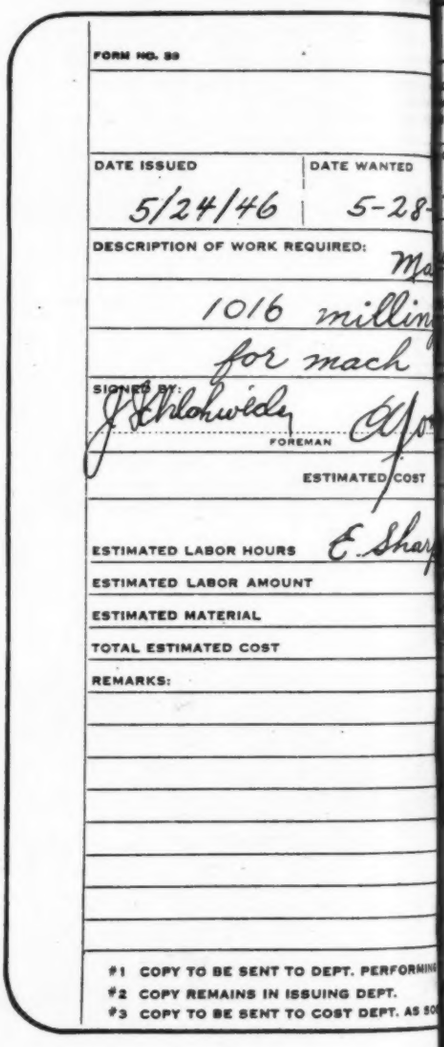
Suppose, on the other hand, that this order, No. 21298, had not been properly estimated by the requisitioning department. Instead the maintenance department estimates that the work will require 16 hours of labor. In that event the order form is sent back to department 15 with a request for more time, and a 20-hour work order is issued.

If a more prolonged job is contemplated, the labor cost will probably be more than 20 hours, and the "over-20-hour" form must be used. This order is not processed in the same way as the 4- or 20-hour orders. Only the plant manager can approve it. When it is approved, if it involves the moving of equipment the department head gets in touch with the plant engineer to learn whether the machine can be placed in the proposed new location, and whether power, air, and water are available. If so, the plant engineer estimates the cost of the entire move.

The department head now must obtain the plant manager's signed approval of the expenditure. The approved expense order is issued to the maintenance department, and constitutes the authority to perform the work. A day-to-day record is kept by the maintenance department clerk of labor and material costs. Reports are made to the plant manager as the work progresses.

The plant engineer's office arranges and helps control all methods and operation costs by appropriate reports to management.

Detailed cost records are set up for each item and each project. Records are posted daily. At any time, and at a glance, the status and cost of an operation can be checked. In this manner, a careful watch guards against excessive expenditures and prevents exceeding the approved appropriation.


FORM NO. 89

DATE ISSUED | DATE WANTED

5/24/46 | 5-28-

DESCRIPTION OF WORK REQUIRED:

1016 millin

for mach

SIGNED BY: J. E. Holowicky FOREMAN

ESTIMATED COST

ESTIMATED LABOR HOURS E. Shar

ESTIMATED LABOR AMOUNT

ESTIMATED MATERIAL

TOTAL ESTIMATED COST

REMARKS:

#1 COPY TO BE SENT TO DEPT. PERFORMIN

#2 COPY REMAINS IN ISSUING DEPT.

#3 COPY TO BE SENT TO COST DEPT. AS SO

The layout department assists in this program by maintaining a constant and accurate record of all machinery movement and building alterations. No orders for changes are issued unless accompanied by an approved layout.

These work orders — good for under 4 hours of estimated working time, under 20 hours, and over 20 hours — classify maintenance jobs and provide a means for effectively controlling job assignments and maintenance costs

FOREMAN'S SHOP EXPENSE ORDER

Order F 21298

Date 7-24-46 | Date Wanted 7-24-46 | Account No. 15-57 | Machine No. #1470 | Motor No.

Mr. Sharpe | Dept. No. 33

Description: Repair control switch (#764321) on punch press.

ESTIMATED COST — Hours 4.0 | Labor 4.0 | Material 6.13

ACTUAL COST

When Completed

Deliver to Punch press Dept. No. 15

Signed by E. Wiehic.

Date Completed 7-24-46 | Foreman E. Sharpe

INSTRUCTIONS:

...ment at once.
...send duplicate copies to payroll department
...ounted for.

ILLINOIS TOOL WORKS

UNDER 4 HOURS

EXPENSE AND REPAIR ORDER

ORIGINAL

...CTIONS: THIS FORM IS USED FOR ALL SHOP EXPENSES WHERE LABOR IS ...ATED AT OVER 4 HOURS BUT NOT OVER 20 HOURS. IT IS ALSO USED FOR ALL ...NE AND MOTOR REPAIRS WHERE LABOR IS ESTIMATED AT OVER 4 HOURS.

...COMPLETED	DEL. TO DEPT. #	MACHINE NUMBER	MOTOR NUMBER
...-28-46	2	#1053	

...vo cabinets similar to cabinet next to ...chine. For storing milling equipment + mach #1003

...OVED BY: | APPROVED BY:

TIME STUDY DEPT. | SUPERINTENDENT

UNDER 20 HOURS

...8.0

ACTUAL COST SUMMARY

MATERIAL USED

DATE	QUAN.	DESCRIPTION	ACCT.	PRICE	UNIT	AMOUNT
5/25	30 ft	2 x 4		.06		1.80
	47	1/4" plywood		.09		4.23
	28	3/4" "		.16		...48
	2	pr hinges		.40		...80
	1	latch				
	1	lock				
	1#					

REQUEST FOR SHOP ORDER

ILLINOIS TOOL WORKS CHICAGO, 6-21- 194 6

Expense # 13164
Dept 4-31 Labor
4-32 material

TO ORDER DEPARTMENT:
PLEASE ISSUE ORDER AS FOLLOWS:

DESCRIPTION

Move and reset machine #1326 in new location as per BIP #71

STATE ADVANTAGE OR REASON FOR ORDER New set up in line operation

WHEN COMPLETED DELIVER OR REPORT TO E. Sharpe

COST ESTIMATED BY Labor and Material SIGNED BY John Purchlo

AUTHORIZED BY E. Sharpe APPROVED BY Chas Irwin TO BE $ 375.00 FACTORY MGR.

PRINTED IN U. S. A.

OVER 20 HOURS

We who are managers of American industry have been talking and writing a lot *to each other* about why we must have a greater public understanding of the need for a return to American principles.

It is my considered opinion that the time has passed for debating *among ourselves* such issues as those of free enterprise *versus* state control, industrial peace *versus* anarchy, maximum production *versus* the philosophy of scarcity, and so forth.

Unfortunately it seems that many of us are content to do just that and no more—to go on expounding the well-known gospel of free enterprise and full production *to each other,* largely ignoring the opportunity and responsibility which is ours to carry the economic facts of life to the fellow who, in the final analysis, is going to call the play on these issues.

I refer to the fellow who works just a few feet away from where you sit in your office, the workman who spends eight hours of every day inside your factory walls. He is hungry for facts about what is going on in America. He is wondering what you are thinking about these issues. Are you telling him?

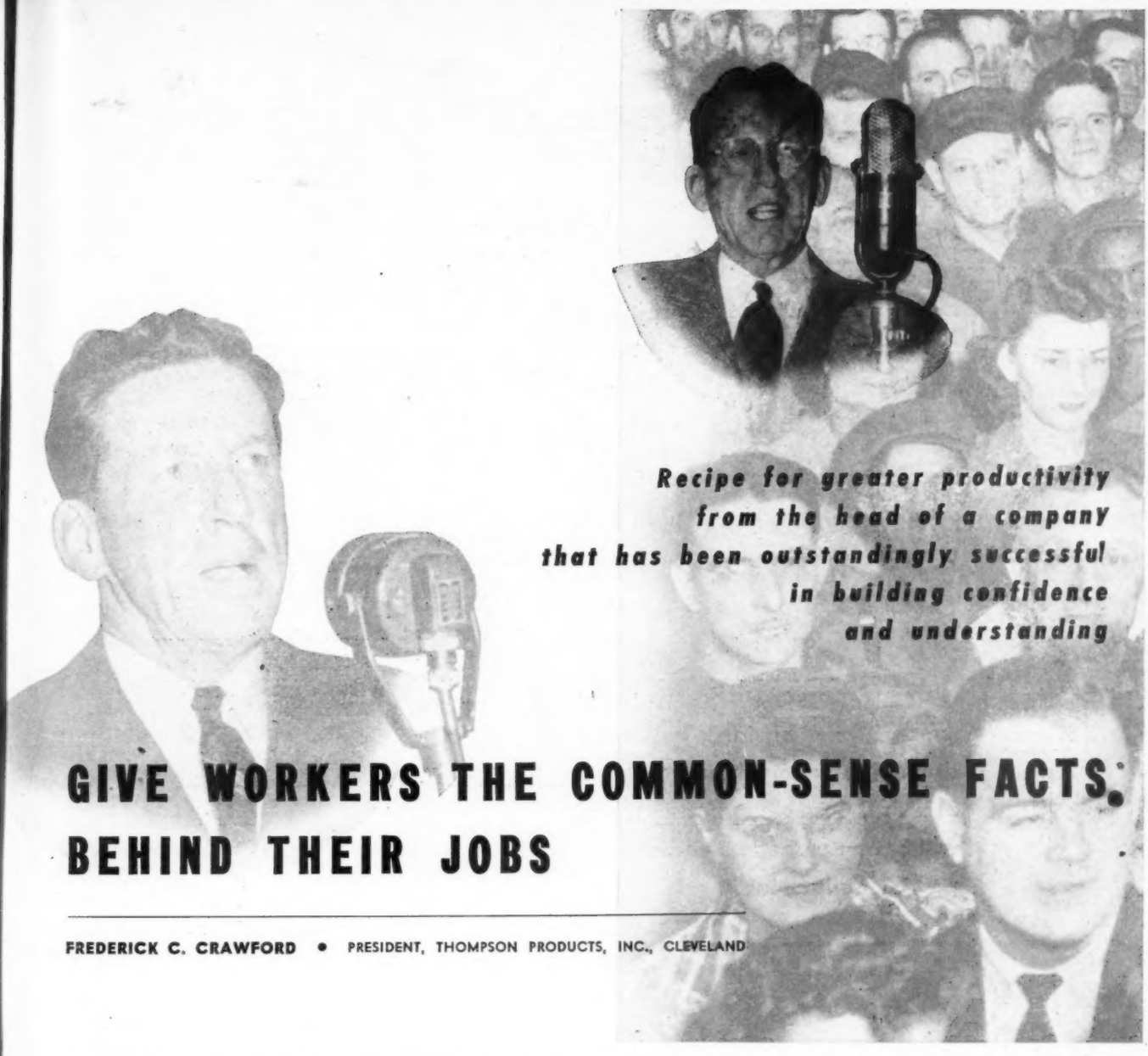
It must be obvious that the ultimate decisions will not rest with the relatively few who comprise the top leadership of American trade and industry, but rather with the whole American public—millions of men and women such as those who make up the working forces of your plant and mine.

Perhaps one of these days some industrial-minded Tom Paine* will step forth and tell the American people the plain, common-sense facts that lie behind their jobs. But until then the job of telling the story—in language everyone can understand—is a job for top management, and it is one that cannot be delegated.

Do you regularly go to your people and talk over your problems with them and tell them the blunt truth about the threats which are everywhere closing in upon the free way of life which made America great?

Do they know and fully appreciate the real differences between self-government and individual freedom, and socialism, fascism, and communism? Of course you

*In January, 1776, Thomas Paine wrote a little pamphlet—"Common Sense"—which historians agreed did more than any other one thing to cause the American people to understand the need for independence.



Recipe for greater productivity from the head of a company that has been outstandingly successful in building confidence and understanding

GIVE WORKERS THE COMMON-SENSE FACTS BEHIND THEIR JOBS

FREDERICK C. CRAWFORD • PRESIDENT, THOMPSON PRODUCTS, INC., CLEVELAND

cannot take it upon yourself to crusade against these isms, but in discussing your day-to-day business problems with your people you will find many opportunities to point out to them how the trend toward state control stands to affect them and their jobs.

Do they understand how your income dollar is divided, and why increased production and lower costs must be achieved if they are to go on as free men and women, enjoying the highest wages and the best living standards the world has ever known?

The American workman is confused. The enemies of our way of life have been bombarding him with cunning propaganda, and in this conflict of ideologies, he doesn't know what to believe.

He is long on intelligence, but short on information. He is looking to you to provide him with the truth and with courageous leadership. If you and I do not give him these things, we might as well stop talking *to each other* about them, and just sit down and compose ourselves to wait for the inglorious end.

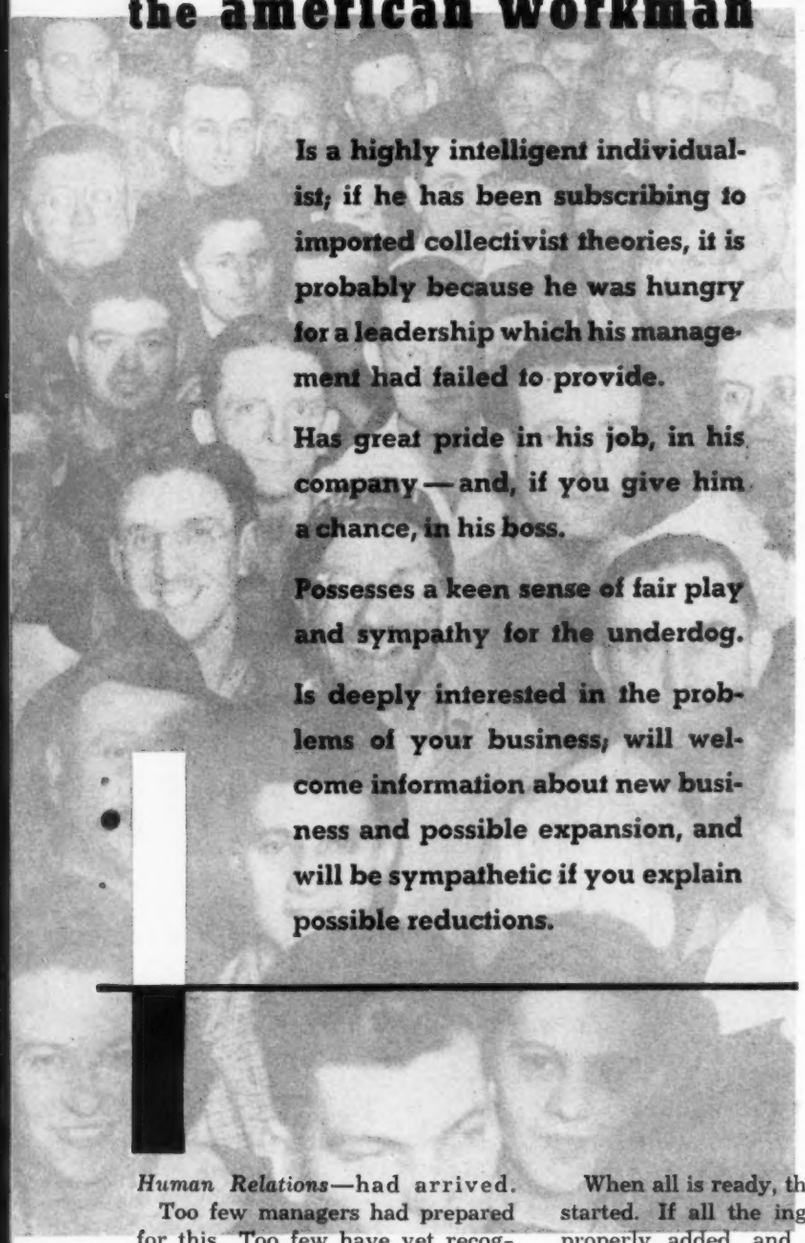
Consider the evolution of your own company. In all probability, in the beginning it consisted of a small shop headed by a manager who relied upon the better mousetrap theory for orders to keep the business running.

As the scientific age advanced, the manager probably found he couldn't keep abreast of technological developments, and found it necessary to hire a good engineer. He, in turn, created products, necessitating the hiring of a salesman to acquaint the public with them.

The salesman, an aggressive fellow, brought in business which called for plant expansion, with resultant complex financial problems beyond the ken of the old-fashioned manager. And so, as the company grew, the services of a financial and accounting expert became necessary. By this time the manager was so busy coordinating his experts that he had to hire still another—a manufacturing expert—to do the job he originally had done.

At the time of World War I, industrial management thus had divided itself into four parts: Engineering, Sales, Finance, and Manufacturing. The decade following brought a fifth requirement. Men's minds were stirring and insistently demanding recognition of themselves as individuals. The need for developing the fifth division—

the american workman



Is a highly intelligent individualist; if he has been subscribing to imported collectivist theories, it is probably because he was hungry for a leadership which his management had failed to provide.

Has great pride in his job, in his company—and, if you give him a chance, in his boss.

Possesses a keen sense of fair play and sympathy for the underdog.

Is deeply interested in the problems of your business; will welcome information about new business and possible expansion, and will be sympathetic if you explain possible reductions.

Human Relations—had arrived.

Too few managers had prepared for this. Too few have yet recognized this need. Too many have thought the job accomplished by the careless designation of some pensioner as "personnel manager." The techniques of human relations in industry have lagged far behind technological developments.

Think of industry as a machine with a great hopper feed. Management has the job of putting into the hopper engineering brains, modern machine tools, raw materials, financial policy, and selling skill—each pretty much a controllable item for which responsibility can be delegated. The most expensive and least controllable element——hours of human labor——must be added.

When all is ready, the machine is started. If all the ingredients are properly added, and if through proper cooperation the hours of labor are used efficiently, useful products begin to flow, and management is successful. But if, through lack of human understanding, cooperation is not there, hours of labor will not be properly used, production will lag, and management will be regarded as a failure.

Here is management's greatest problem—how to bring about the human understanding that will result in voluntary worker cooperation and the consequent efficient use of hours of production.

Hitler sought to solve this problem by using force to secure full production. But America is still a land of freedom, dedicated to the dignity of the individual and the sacredness of his person. Here we recognize that no man can forcibly control another. We recognize that each man's mind and will dictate what he does with the hours of labor he has to sell.

Only through understanding will the American workman release his energy and go along in a spirit of friendly cooperation toward the golden goal of full production and abundance under the American system of free enterprise. He will conserve his time and increase his productive efficiency only if he understands why it is to his personal advantage to do so. The job of explaining why this is true belongs to top management.

Consider the plight of the manager whose production calls for 200,000 hours of human labor a week. In the beginning, had the Almighty been mindful of mass production, He undoubtedly would have allotted 200,000 hours to the manager to use in the production machine.

IT'S A PROBLEM OF MAN-POWER

But hours of labor were dealt out sparingly—eight working hours a day to each individual whether good or bad, lazy or diligent, cooperator or troublemaker. And so the manager must go out into the highways and byways and call for 5000 volunteers who will put their hours of labor into the hopper. As they line up, the manager finds them all to be different in outlook, temperament, and degree of skill. But they possess one thing in common—*each is a free American with the will to cooperate or obstruct, as he pleases.*

Five thousand persons—5000 free minds—5000 chances for misunderstanding—each of whom can upset or retard the productivity of the machine. What a spot the manager is in! But is his case hopeless? Emphatically, it is not, if only he will start today to win the confidence of those 5000 free minds, and imbue them with the urge to release the energy they control, not because he asks them to, but because they themselves want to.

How can you, as a manager, bring about this happy state of affairs?

As a first move, call your workers together. Ask them about their problems. Tell them about yours. Explain the simple relationship between wages and job security and productivity. Review the natural laws of production. You will be amazed at the response if you have never done this before. You will find that American workmen are good citizens, patriotic, honest, well-intentioned, and anxious to be informed about your business.

You will find that the American workman is a highly intelligent individualist; if he has been subscribing to imported collectivist theories, it is probably because he was hungry for a leadership which his management had failed to provide. You will discover he has been seeking only what he thought was best for himself.

WORKER PRIDE

And you will find that he has great pride in his job, in his company—and, if you give him a chance, in his boss. You will find that he possesses a keen sense of fair play and sympathy for the underdog. You will discover that he is deeply interested in the problems of your business—sales problems, production and manufacturing problems. He will welcome information about new business and possible expansion, and he will be sympathetic if you explain possible reductions.

Have regular meetings. Tackle any subject that appeals to your people. Give honest answers to every question, and if you don't know the answer, frankly say so, and get it for them as quickly as you can. If your plants are widespread, and you can't often reach all of your people, talk to as many as you can and teach your plant managers to talk to the others.

The meetings will improve as you build in your workers a confidence in yourself. The results will surprise you. No oratory is required, only honesty and sincerity. Any manager who knows his business can talk about it and discuss the simple economic facts of life.

To be sure, there are other effective methods of building confidence and understanding by sharing company information with employees. Readers of the May issue of FACTORY know how extensively the Thompson organization relies upon the printed word in getting facts about our business, and economic conditions generally, to our workers.

Our basic philosophy is set forth in employee handbooks which not only list our policies and procedures, but explain how and why they were formulated. Simplified financial reports, mailed to the homes of employees, keep them as well informed as stockholders about our progress.

We strive to maintain a sharp news sense all along the line so that when a newsworthy event occurs, whether it concerns a general wage increase, a work reduction, a plant expansion, or an organized attack upon the company by one of the international unions, our people quickly get the story by means of the plant newspaper, spot bulletins, or letters mailed to their homes.

Whether the news is favorable or unfavorable to the company, we want our workers to get it from us first, fully and factually, before the deadly rumor bug has a chance to get to work. In our company this has paid off a thousand fold. Our people have never let us down in any crisis.

If you will get on friendly terms with your people, and let them know you and your problems, and if you deal straight across the board, you will have found the answer to your human relations problem which, in the final analysis, is the answer to the problem of full production and the preservation of the American way of doing business.

It has been a source of wonder to me that so many managers still cling to the erroneous idea that there is something in the law that prevents the boss from talking to his men. I want to dispel that notion here and now.

The First Amendment to the Constitution of the United States of America states clearly: "Congress shall make no law . . . abridging the freedom of speech, or of the press. . . ."

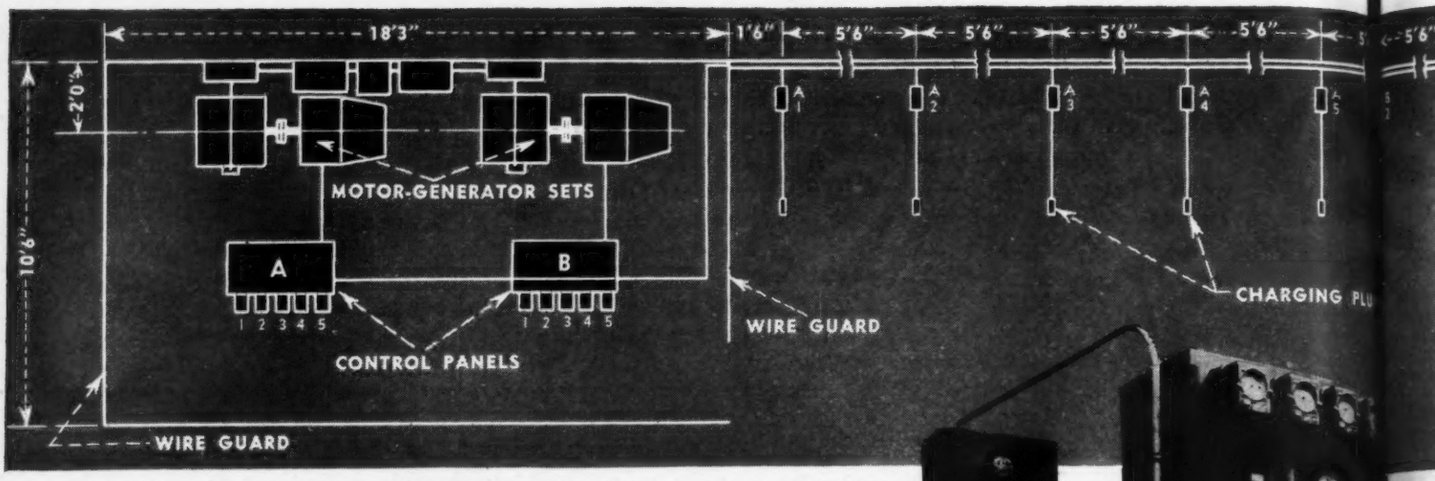
Subject only to the laws of slander and libel, you can talk on any subject, any time, anywhere.

This is still free America, and the protection of the Constitution extends to members of American mangement. You have the right to speak to your people on any subject you choose, and I urge you to exercise this right of free speech in your efforts to attain full productivity, which is the only key to the higher wages, the lower costs, and the improved living standards we all desire.

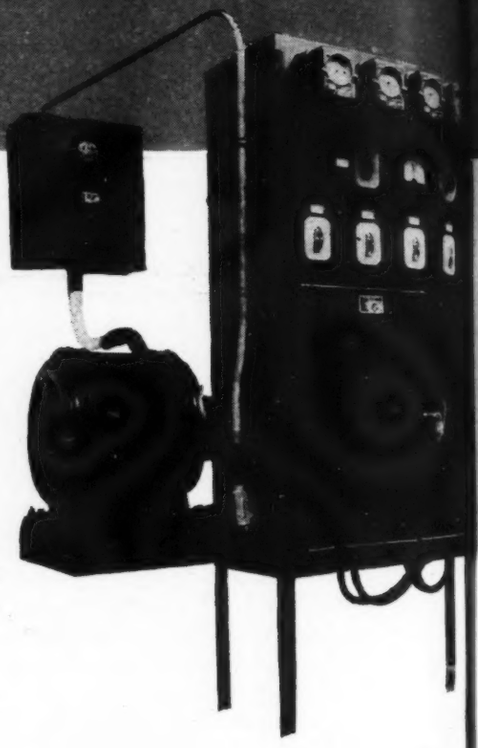
To management, he's its "fightingest" exponent of the right of free speech and the most effective user of that right in staving off attempts to unionize his company. To labor, he's the most stubborn objective ever tackled and one for which the Auto Workers have created a special organizing committee to intensify their years-old battle to organize.

Frederick Coolidge Crawford, president of Thompson Products and ex-president of NAM, however, is known nationally for many interests. He's among the leading collectors of ancient automobiles. He sponsors the Thompson Trophy race, highlight of the National Air Races. He's in demand as a speaker. He takes an active part in Cleveland civic life. He's a member of many clubs, sits on director's board of all kinds of institutions. He keeps Thompson vice presidents driving hard just to avoid losing sight of him. He works hardest of all, perhaps, at knowing Thompson people, knowing their problems, and selling them his viewpoint with a sincerity, logic, and humor that hasn't been beaten.

With it all, he's earned the title among Cleveland executives and probably industrial leaders all over the country as "the finest exponent of the American industrial system of free competitive enterprise."



HOW MOTOR-GENERATOR SETS, CONTROL PANELS, AND CHARGING STATIONS ARE ARRANGED



The new battery charging equipment comprises two 25-kw. motor generator sets with panels that automatically control charging rates and time

LOWER BATTERY COST BY BETTER CHARGING

E. W. KERWIN • GENERAL TRAFFIC MANAGER, SUNSHINE BISCUITS, INC., LONG ISLAND CITY, N. Y.

First benefit from improved battery charging facilities at Sunshine is a 15 percent saving in energy. Second—and more important—all truck and tractor batteries are charged properly, with attendant economies in maintenance.

These trucks and tractors are virtually the backbone of the handling system within the plant. The fleet now in operation comprises twelve units—ten pusher-type tractors, one low-lift truck for handling materials on skids, and a high-lift model for up-to-the-ceiling storage. Failure of any one would seriously hamper operations.

Every night each truck and tractor is given a quick but careful looking over to make sure that all parts are in working order. Once a week each vehicle is given a detailed inspection, covering the motor, controller, transmission, brakes, steering gear, wheels, and tires. About every two years each vehicle is torn down. Elements that are defective or worn are replaced.

Proper care and charging of the batteries have been found to be of prime importance in securing dependable, trouble-free service from these trucks and tractors. All the batteries in these vehicles are of the alkaline type. Practically all have been in service for years.

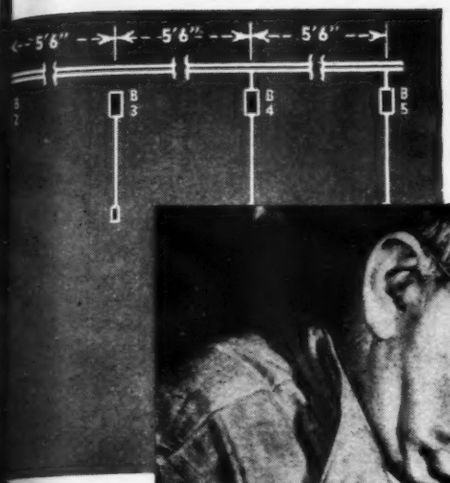
All batteries are checked at least twice a week and water is added, if necessary. About every two months they are carefully cleaned. Every two years the solution is changed.

The batteries are charged at night. If any of the vehicles are doing unusually hard work, batteries may be charged during the lunch hour.

Greatly improved charging facilities have recently been installed. Previously a 120-volt d.c. generator was used to charge the vehicle batteries. However, this machine was not adapted to meet the company's battery charging requirements economically. For example, to obtain somewhere near the correct voltage for charging, it was necessary to connect two batteries in series. There was no provision for tapering off the charging rate, or discontinuing charging when completed. As a natural consequence, it frequently happened that some batteries were overcharged, while others were not brought up to full strength.

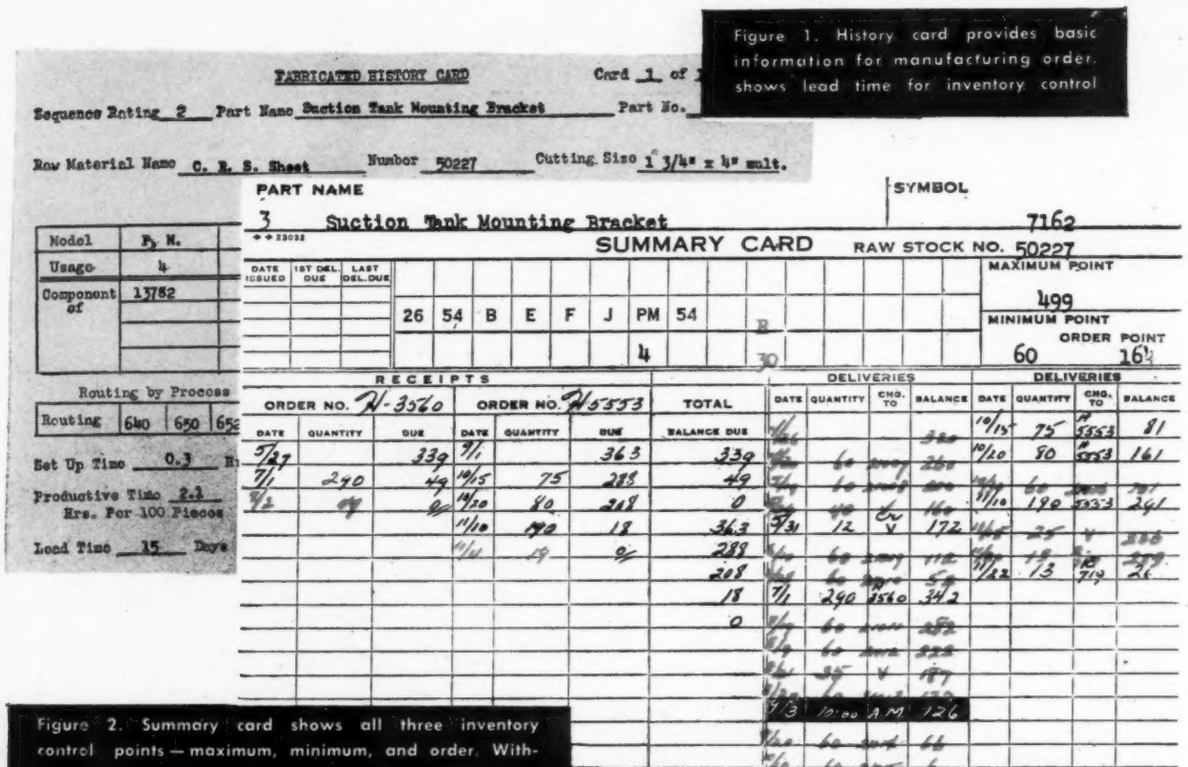
The new charging equipment consists of two 25-kw. motor-generator sets with automatic controls. Each set can charge five batteries simultaneously. A separate circuit is run from the control panel to each of the five charging stations supplied by that unit. Charging rate and time can be controlled for each charging station.

Now when a vehicle is brought in for charging at night, the attendant checks the test cell in the battery to determine the rate and time of charge needed. Then he sets the meter, on the control panel, for the charging station to be used, and plugs the battery in. As charging progresses, the rate is automatically tapered off and charging is stopped at the end of the desired period.



BEFORE A VEHICLE IS PUT ON CHARGE, TEST CELL IS CHECKED TO DETERMINE AMOUNT OF CHARGING REQUIRED

WEEKLY INSPECTIONS DISCLOSE ANY PARTS THAT NEED MAINTENANCE. HERE A CONTROLLER IS BEING ADJUSTED



FABRICATED HISTORY CARD Card 1 of 1

Sequence Rating 2 Part Name Suction Tank Mounting Bracket Part No.

Raw Material Name C. R. S. Sheet Number 50227 Cutting Size 1 3/4" x 4" mult.

Model	F, M.
Usage	4
Component of	13752

Routing by Process

Routing	640	650	65

Set Up Time 0.3 Hr

Productive Time 2.1 Hrs. Per 100 Pieces

Lead Time 15 Days

PART NAME 3 Suction Tank Mounting Bracket

SYMBOL 7162

SUMMARY CARD RAW STOCK NO. 50227

DATE ISSUED | 1ST DEL. DUE | LAST DEL. DUE

26 54 B E F J PM 54 B

4 30

MAXIMUM POINT 499

MINIMUM POINT 60

ORDER POINT 161

RECEIPTS

ORDER NO. W-3560 DATE	QUANTITY	DUE	ORDER NO. W-5553 DATE	QUANTITY	DUE	TOTAL BALANCE DUE
5/29		339	9/1		363	339
7/1	240	49	10/5	75	288	49
8/2	49	0	10/20	80	208	0
			11/10	190	18	363
			11/21	19	0	288
						208
						18
						0

DELIVERIES

DATE	QUANTITY	CHG. TO	BALANCE
11/			380
7/	60		280
7/	60		220
7/	40	[illegible]	140
7/31	12	V	172
8/	60		112
8/	60		52
8/	52	V	187
7/3	12:00 AM		126
8/	60		66
8/	60		6

DELIVERIES

DATE	QUANTITY	CHG. TO	BALANCE
10/15	75	W 5553	81
10/20	80	W 5553	161
11/10	190	W 5553	351
11/	25	V	326
11/22	13	W 719	339

Figure 1. History card provides basic information for manufacturing order, shows lead time for inventory control

Figure 2. Summary card shows all three inventory control points — maximum, minimum, and order. Withdrawals (orange) and receipts (black) are listed by day and order number. Physical count results boxed

THREE-POINT PROGRAM FOR PRODUCTION CONTROL

G. T. MITCHELL • CHIEF INDUSTRIAL ENGINEER, OZALID DIVISION OF GENERAL ANILINE & FILM CORPORATION, JOHNSON CITY, N. Y.

Three-point inventory control plus a master file of manufacturing orders. That's how Ozalid Division of General Aniline and Film Corporation has answered the problem of controlling production of more than 7500 different items.

Chief virtues of the plan have been found to be the rapidity with which information is available at low cost, and the flexibility which permits it to be adapted to varying timekeeping procedures, cost summaries, material movement procedures, and many other manufacturing shop functions.

Speed of the control plan, and hence its effectiveness, is based on the use of translucent master sheets from which all copies of the manufacturing order and other related forms can be duplicated quickly for use on each order. In this manner, any number of orders can be issued with a minimum of handwriting and without the typing—with all its attendant danger of errors—experienced in many other production control plans.

The plan originates in the inventory control file, which furnishes a complete history (Figure 1) of each individual item used in the fabrication and assembly of the various products. Inventory balance card (Figure 2) is kept current by posting any material movement to and from stock at 2-hour intervals. Card lists three inventory control points

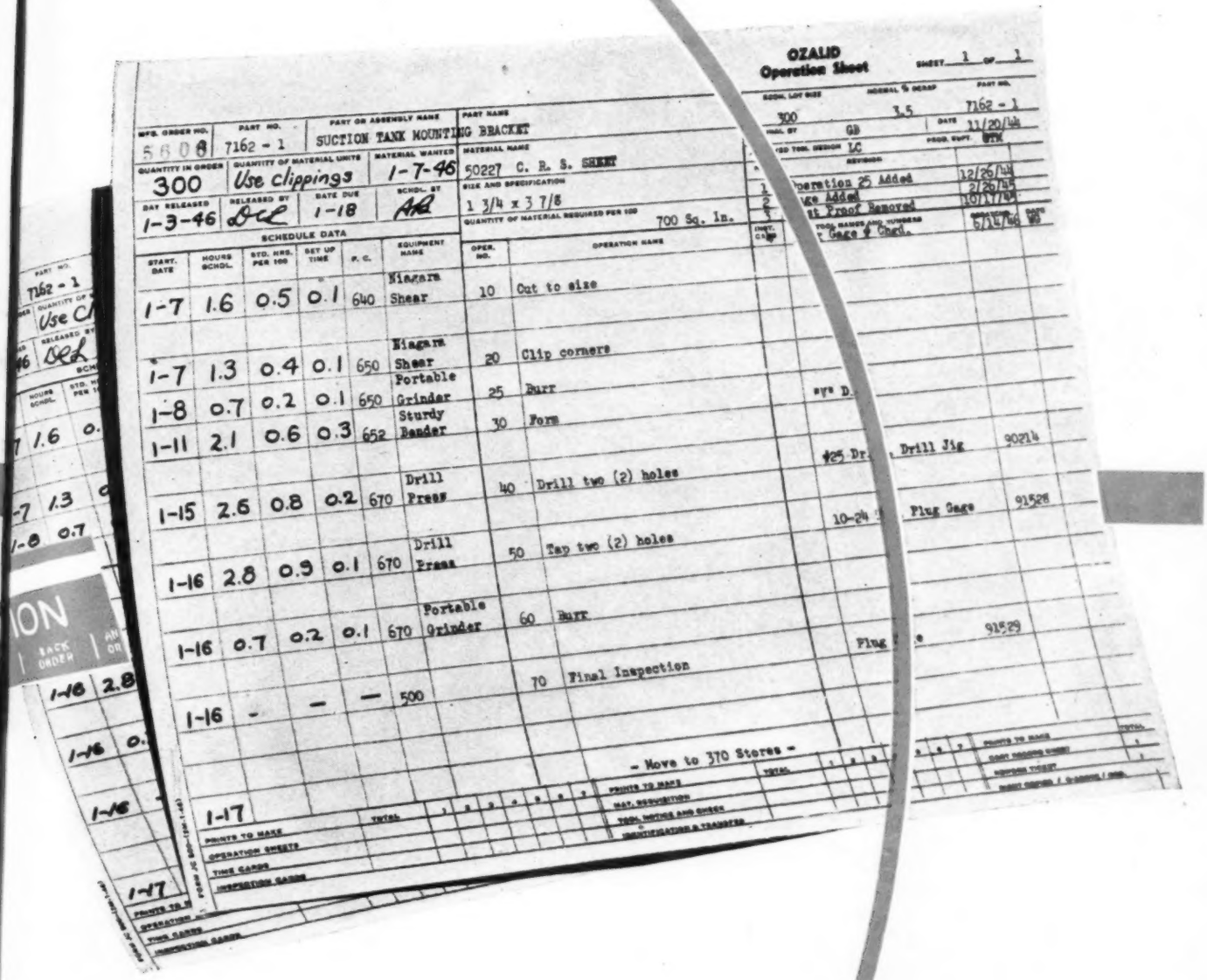

OZALID
Operation Sheet
SHEET 1 OF 1
MFG. ORDER NO. 5608
PART NO. 7162 - 1
PART OR ASSEMBLY NAME SUCTION TANK MOUNTING BRACKET
PART NAME
QUANTITY IN ORDER 300
QUANTITY OF MATERIAL UNITS Use clippings
MATERIAL WANTED 1-7-46
MATERIAL NAME 50227 C. R. S. SHEET
SIZE AND SPECIFICATION 1 3/4 x 3 7/8
DAY RELEASED 1-3-46
RELEASED BY DCL
DATE DUE 1-18
SCHED. BY AR
QUANTITY OF MATERIAL REQUIRED PER 100 700 Sq. In.
SCHEDULE DATA
START. DATE | HOURS SCHED. | STD. HRS. PER 100 | SET UP TIME | P. C. | EQUIPMENT NAME
OPER. NO. | OPERATION NAME
1-7 | 1.6 | 0.5 | 0.1 | 640 | Niagara Shear | 10 | Cut to size
1-7 | 1.3 | 0.4 | 0.1 | 650 | Niagara Shear | 20 | Clip corners
1-8 | 0.7 | 0.2 | 0.1 | 650 | Portable Grinder | 25 | Burr
1-11 | 2.1 | 0.6 | 0.3 | 652 | Sturdy Bender | 30 | Form
1-15 | 2.6 | 0.8 | 0.2 | 670 | Drill Press | 40 | Drill two (2) holes
1-16 | 2.8 | 0.9 | 0.1 | 670 | Drill Press | 50 | Tap two (2) holes
1-16 | 0.7 | 0.2 | 0.1 | 670 | Portable Grinder | 60 | Burr
1-16 | - | - | - | 500 | | 70 | Final Inspection
- Move to 370 Stores -
1-17
PRINTS TO MAKE
OPERATION SHEETS
TIME CARDS
INSPECTION CARDS
TOTAL
MAT. REQUISITION
TOOL WRITING AND ORDER
IDENTIFICATION & TRANSFER
Operation 25 Added 12/26/44
Added 2/26/45
Proof Removed 10/17/44
Gage & Check. 5/14/46
Drill Jig 90214
Plug Gage 91528
91529

Figure 3. Only "variable" information need be entered on master copies of manufacturing order; duplicates are produced rapidly, accurately. Requisition copies made by inserting "overlay" during the reproduction process

previously established for each item—minimum point, order point, and maximum point. Control points in this plan are determined in the following manner:

Minimum Point. Represents the amount of material considered economically practical to carry as a reserve stock to meet the contingencies encountered in production or through periodic excessive consumer demand.

Order Point. Set by adding to the minimum point the anticipated use for the item during the time in which the new order is being processed and delivered to stock. "Anticipated use" is determined by multiplying the average daily consumption by the number of days of "lead time." Lead time is the estimated number of calendar days between the preparation of an order and the receipt of the material, and is recorded on the history card (Figure 1). The order *quantity* is the difference between the maximum point and the order point.

Maximum Point. Average daily consumption of the part is multiplied by the calendar days in the ordering cycle to determine the quantity that is later added to the order point. This addition produces the largest quantity of stock that is to be carried or accounted for, and is known as the maximum point. The "most economic" ordering cycle is determined from production, engineering, and procurement data.

In using this three-point control, it is important that a review be made periodically, depending upon conditions that may have a direct effect upon the items. Special attention is given to problems peculiar to particular products or processes, such as seasonal demand and replacements on existing products.

An important factor in the success of the inventory control plan is the use of calendar days in all calculations. Time continues to pass regardless of the number of working days in a given period; thus all calculations are made on the same basis.

Working from these three points, each inventory control card furnishes an exact picture of the material inventory and total balance due on all orders, as well as on each outstanding order. All due dates, current fabrication information, and purchasing data are posted on this card so that a daily check of overdue orders can be prepared the first thing each morning. Control summaries and spot checks can be made quickly through the entire file by using various combinations of visual color tabs. Whenever the daily inventory reduces to the order point, the preparation of a manufacturing order (Figure 3) is begun.

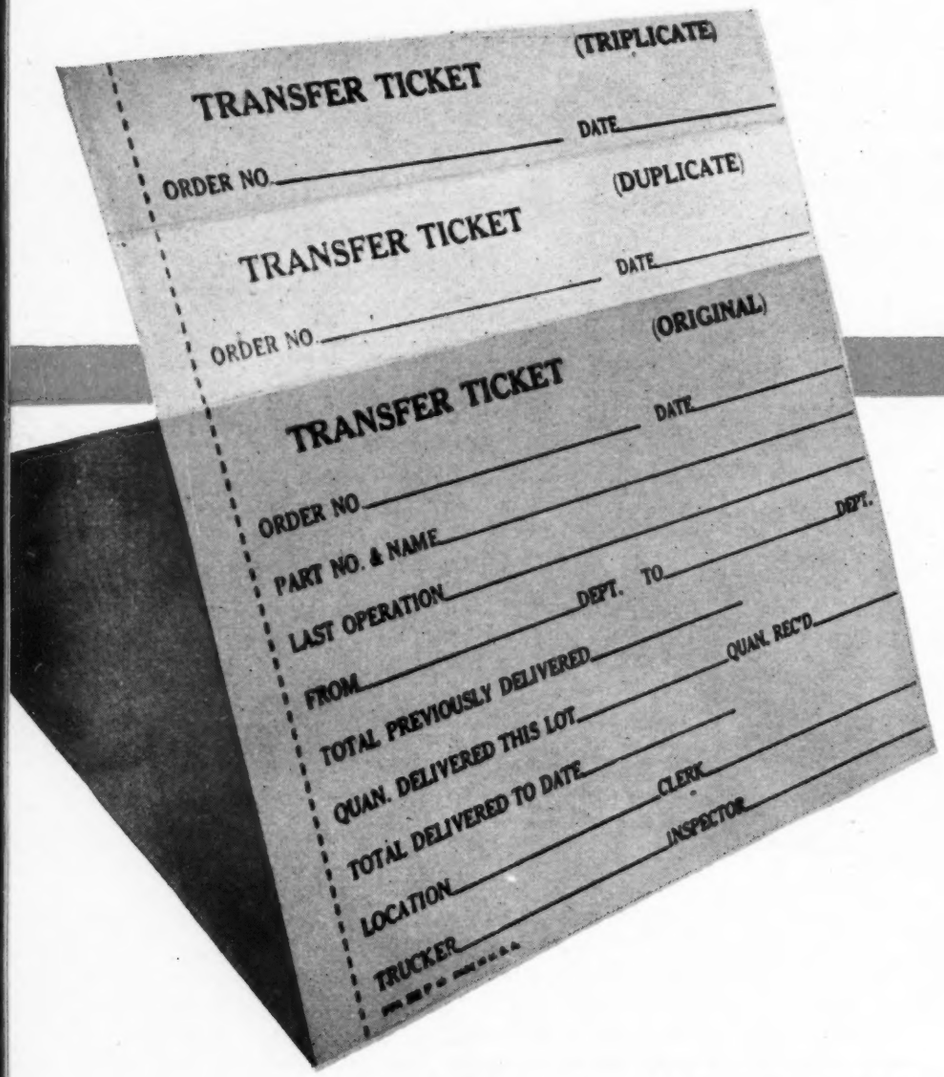


Figure 4. Transfer tickets record movement of material, are picked up every two hours. Together with rapid reproduction process, they make possible quick dispatch of up-to-the-minute information on order status to the foremen and expediters

MASTER SHEETS

Key to the rapid issuing of manufacturing orders is a reproduction process that produces positive copies directly from master operation sheets. A number of translucent copies of the operation sheet, bearing all standard information, are

prepared from the original masters and filed. When an order to produce is received, the work order clerk prepares one of these "secondary" masters by adding, in india ink, the manufacturing order number, production data, schedule dates, and any other variable information, along the left side of the sheet. When completed, checked, and signed by the authorized person, it becomes the master copy of the manufacturing order. It is used to produce the shop copy of the order itself, copies for each dispatcher concerned, two material requisitions, and the cost record sheet.

UNLIMITED COPIES

The copies are made by running the master sheet and the sensitized paper for each copy through the reproducing machine. On the reverse side of the order, spaces are provided for the standard inspection data. The dispatchers' copies are identical with the manufacturing orders on the face; the reverse is arranged to permit the accumulation of dispatchers' data as the order is processed through the shop. The requisition copies are made by fastening an "overlay" identification tag to the original translucent sheet (inset, Figure 3). In this manner there is an exact duplication of data used for office records.

Material movement from one process to another is recorded, after inspection, on a transfer ticket (Figure 4). The duplicate transfer tickets are picked up every two hours and delivered to the chief dispatcher. These duplicates enable the quantity and exact location of every item to be known and controlled from one point. The chief dispatcher marks each day's movement of all materials on a translucent copy of the "weekly production schedule," which bears identification, quantity, and shop routing of each material item issued during the week. Whiteprint copies of the entire schedule are furnished to foremen and dispatchers throughout the shop on the first day of each week. Copies can be run off at other times, if desired, and show the status of any item in process, with only a 2-hour time lag.

Another important guide to shop control is the "daily critical schedule," which also is furnished in whiteprint form. Listing it on the critical sheet is a signal to give an order priority over regular production commitments.

This schedule carries any item on which the inventory is below the minimum or danger point, as indicated by the three-point control plan. It includes anticipated shortage items on purchases, fabricated pieces, subassemblies, hardware, and any item required for final assembly. It shows the part number and name, quantity, number of daily occurrences, location in the cycle of operation, and the person or process being held responsible for the delay. Experience has shown that foremen, dispatchers, and others are anxious to eliminate their names from the critical schedule, with the result that in most cases, urgent materials move without personal expediting from the central point.

DAILY CRITICAL SCHEDULE

Daily Average Requirement — 6500 pcs.
Average Delivery for 114 Days — 6492 pcs.
Number of Jobs Completed 6/11/46 — 27

Total No. of Pieces — 3857

FINAL ASSEMBLY BACK ORDERS

Part No.	Description	QUANTITY	ATTENTION TO
19000 MACHINE			
19083	Side Cover	1	Francisco-Hollister
MODEL F			
10168	Motor	1	Hofmann
PRINTMASTER MACHINE			
13515	Cable	5	Swartz-Caraker
14066	Wire	15	Swartz-Caraker
54" PRINTMASTER			
13870	Paper Roll Cover	1	Francisco-Hollister
14061	Feed Board	4	Swartz-Caraker

FABRICATION

Part No.	Description	Occurrences	Progress
610	Roller	1	62 — 70D — 70B — 80 — 0
2529	Support	1	40 — 70D — 0
6170	Stand	8	51W — 50B — 80 — 0
6177	Cover	3	80 — 0
7154	Roller	4	60A — 62 — 60G — 80 — 70D — 80 — 0
7186	Endplate	5	52P — 80 — 0
7232	Bracket	5	80 — 0
7238	Face Plate	3	40 — 52P — 70B — 70D — S.C. — 0
7239	Plate	5	Waiting for Order
7287	Cover	3	80 — 0

Figure 5. Orders behind schedule — and rush orders — are listed here. Naming the "party held responsible" gets action

On a big job that means moving between 500 and 600 machines, a large print showing the new locations of the machines was hung on a wall of the plant engineering department. As each machine was moved and bolted down, half of its templet was colored red. The other half was colored green when the machine was ready to run

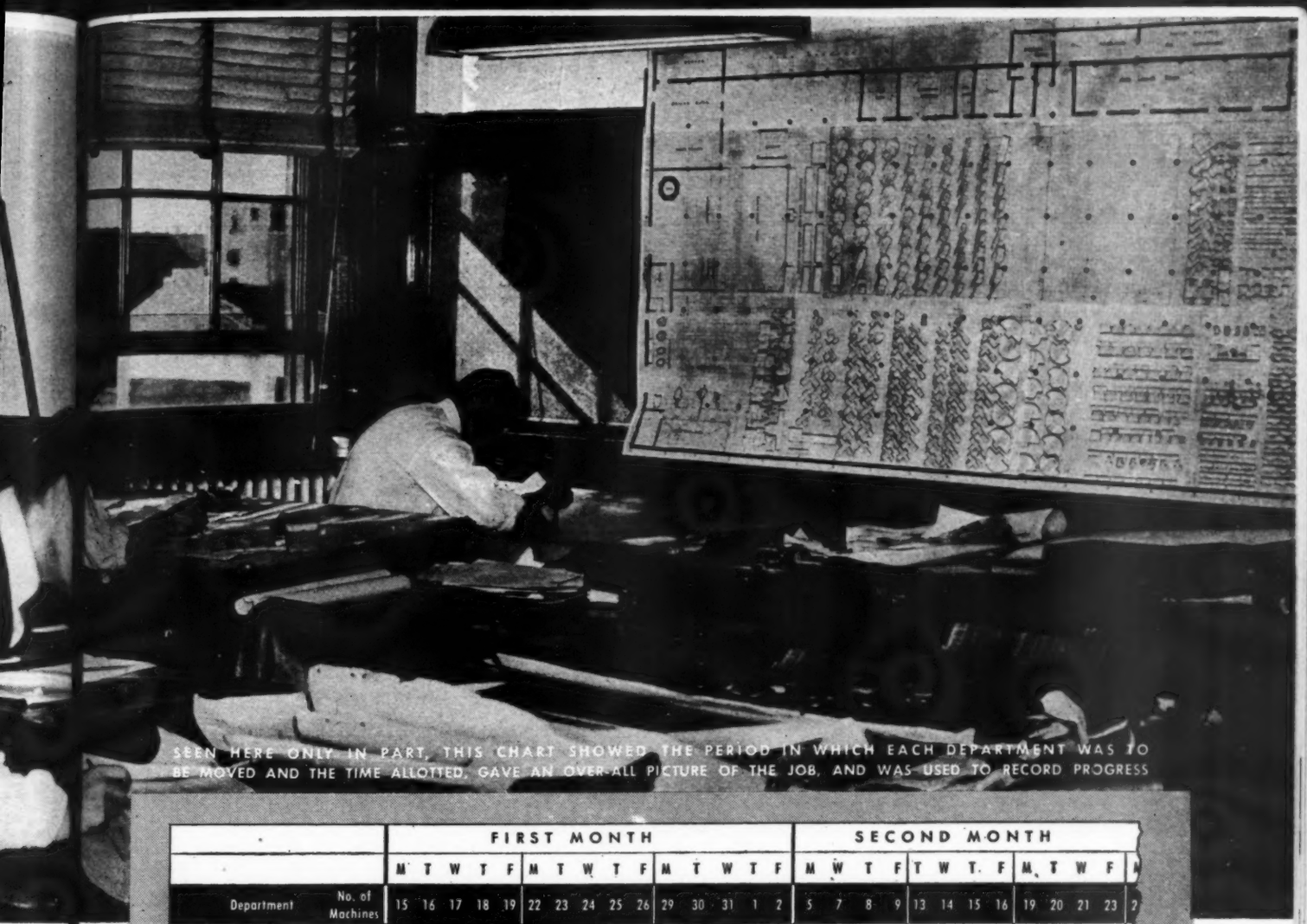
PLANNING GETS MAINTENANCE WORK DONE ON TIME

G. S. STRINGER • CHIEF PLANT ENGINEER, FORD INSTRUMENT COMPANY, INC. LONG ISLAND CITY, N. Y.

Maximum simplicity consistent with satisfactory results is the guiding principle that is always followed in scheduling and keeping track of the work handled by the Ford Instrument plant engineering department. A simple system is used for the ordinary run of work, and has proved itself adequate. But there is no attempt to make it serve when a job of unusual complexity or size comes along.

Such an occasion arose recently when it became necessary to move between 500 and 600 machine tools in 14 departments to new locations, which in many instances were in another plant. These tools included light and heavy screw machines, drill presses, lathes, and grinding machines. The move had to be completed in 47 working days. Also, the whole project had to be carried out with the least possible interference with production, which meant that every machine had to be put back into service in the minimum of time. These requirements made it necessary to plan every phase of the work carefully and set up an effective method of checking the progress.

The first step involved making a scale templet of each machine and fastening these templets to plywood boards of convenient size for handling, on which had been pasted



SEEN HERE ONLY IN PART, THIS CHART SHOWED THE PERIOD IN WHICH EACH DEPARTMENT WAS TO BE MOVED AND THE TIME ALLOTTED. GAVE AN OVER-ALL PICTURE OF THE JOB, AND WAS USED TO RECORD PROGRESS

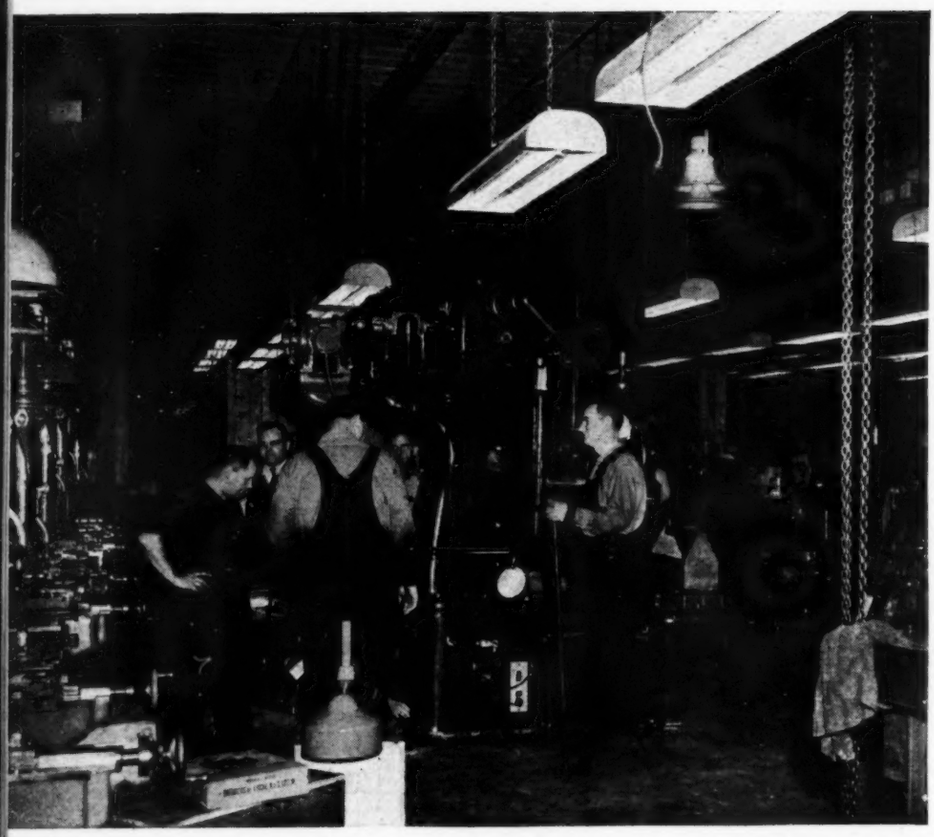
		FIRST MONTH														SECOND MONTH										
		M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	W	T	F	T	W	T	F	M	T	W	F
Department	No. of Machines	15	16	17	18	19	22	23	24	25	26	29	30	31	1	2	5	7	8	9	13	14	15	16	19	20	21	23
One Piece Shop	x																											
Milling	x																											
Heavy Machine	x																											
Grinding	x																											
Bench Lathe	x																											
Engine Lathe	x																											
Precision Machining	x																											
Gear	x																											
Sensitive Drill	x																											
Radial Drill	x																											
Shop Office																												
Auto. Screw Mach.	x																											

sheets of paper that showed an accurate plan of each floor where the machines were to be installed. When these layouts had been approved they were photographed and blueprints measuring approximately 9½x4½ feet were made. Copies of the prints were given to the plant engineers of the four plants affected.

The order and the period in which the different departments should be moved were decided, and the schedule, shown in part directly above, was drawn up. Copies of this schedule also were given to the plant engineers and to the superintendents and foremen of the departments that were to be moved. This procedure insured that everyone concerned with the moves knew when they were to be made, and could plan accordingly.

While this planning was going on the new locations for the machines were being prepared. This preparatory work also was done in a definite order and according to the schedule mentioned before.

As each machine was moved to its new location and bolted to the floor, one-half of its templet on the big blueprint of the layout was colored red. When any needed mechanical work had been done and the electrical and other connections made, the other half of the templet



Here a jig borer is being installed. Careful planning beforehand and up-to-the-minute checking of progress kept such work moving smoothly and according to schedule

was colored green. Much care was taken to see that this simple record of progress was kept right up to the minute.

At the end of each day the blanks representing time periods in the schedule were also filled in to an extent that represented with fair accuracy the progress made.

With these two simple schemes it was possible to determine in a moment, at any time, just what had been done, what still remained to be done, and how closely the schedule was being followed. So much had to be done in such a short time that there was no danger of getting too far ahead of the schedule. However, any lagging behind schedule was readily detected and whatever measures were necessary to speed up the work were promptly taken. With this close control it was possible to keep everything moving smoothly and finish the work on time.

At present the Ford Instrument Company is operating three good-sized separate plants. The plant engineering department is responsible for many diverse kinds of services. Many of its duties are of routine nature, but some of the jobs assigned to it are non-recurrent, while a considerable number can be called of emergency character.

Simple procedures have been developed whereby this work, too, can be scheduled and checked.

Each plant has its own plant engineer and maintenance force. There are 207 men in the maintenance departments of the three plants. All maintenance work must be requested on a maintenance work order form that is made out in triplicate. If the maintenance foreman whose group will handle the work estimates that the cost will not exceed $15, the white original is retained by the foreman, the yellow duplicate is sent to the plant engineer, and the pink triplicate is retained by the foreman of the department requesting the work.

For jobs that will cost more than $15 the work order must be approved by the supervisor of the originating department, and by the chief plant engineer.

In any event, the work called for is performed in due course, assuming that it is not of emergency nature. When emergencies come up they are handled as quickly as possible and an order for the work is issued later on.

Upon completion of the job requested in the work order the maintenance foreman records on the original the time and material spent, has the order signed by the shop foreman who issued it, certifying that the work has been done satisfactorily, and sends it to the chief plant engineer for recording and use in estimating future jobs.

APPROVAL FOR BIG JOBS

Jobs that involve sizable expenditures, such as the installation of factory equipment, building improvements, and construction work, are distinguished by the letter E preceding the job number. They must be approved by the vice-president in charge of manufacturing. Copies of the approved order are sent to the chief plant engineer, the plant engineers of the different divisions, the controller, and other interested departments.

Once a week, or oftener if necessary, the chief plant engineer and the plant engineers of the three divisions meet and go over the work for which they are responsible. The status of every uncompleted job is reviewed. Causes of delays or any unusual condition affecting the work are discussed. Plans are made for handling new jobs, and schedules covering them are drawn up. If the plant engineer of one division needs more men to finish some unusually large job on time, as frequently happens, he is privileged to ask that enough tradesmen from the other plant engineering departments be assigned to his crew to permit execution of the work in the time allowed.

This method of scheduling and checking the activities of the plant engineering department involves about the minimum of paperwork, but it serves satisfactorily for the majority of jobs. When some unusual project requires a more elaborate system of control, one that will meet all the requirements is worked out.

STANDARDIZED HOPPERS

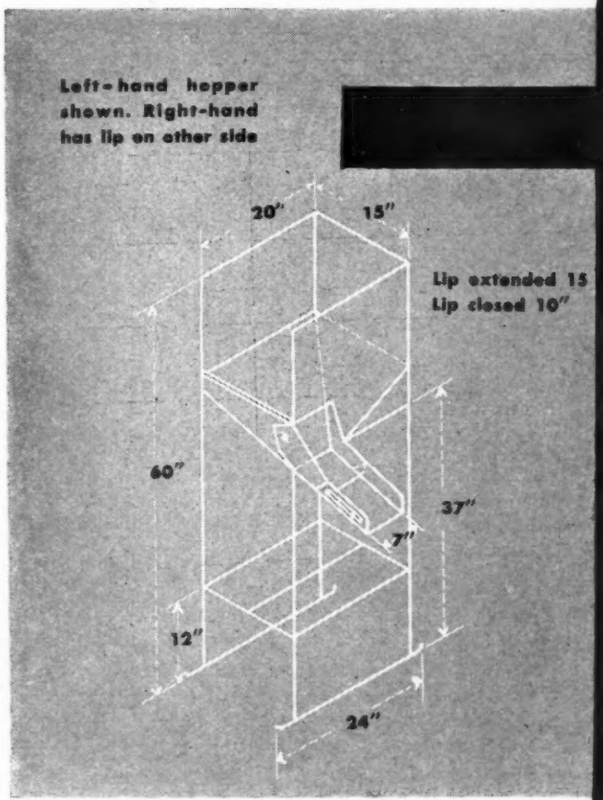
PAUL W. RHAME • MANAGER OF MANUFACTURING, AC SPARK PLUG DIVISION GENERAL MOTORS CORPORATION, FLINT, MICH.

suggestions for hopper design

- **Use standards hoppers whenever possible**
- **All hoppers should be individual units and not fastened to each other**
- **The sliding door should be on the outside of the hopper**
- **The loading point should not be over 45 inches above the floor**
- **The lip size should not be less than 4 inches x 4 inches**
- **The end of the lip should be at a 30° angle with the horizontal and not over ⅜ inch high**
- **The top of the hopper should not be less than 4 inches x 11 inches**
- **The slope of the bottom of the hopper should be between 2½ to 1 and 3 to 1**
- **Full-sized layouts of the workplace area should be made on all but very simple set-ups**

No need for improvisation or experimentation when someone at AC Spark Plug wants a hopper. One has only to turn to a set of rules and a collection of blueprints made available to methods men and other supervisors. He may then select the shop-tested, standardized hopper best suited to the job.

The set of guides and working drawings of seven of the Division's standard hoppers are reproduced here in the thought that they may be useful to plant operating men in other plants who wish to cash in on the many and obvious benefits of standardization—(1) variety of hoppers available are controlled; (2) cost of hopper construction is reduced; (3) hoppers no longer needed on one job can be used on another; (4) time is saved in workplace layout and in ordering hoppers, as drawings and specifications on all types are available.



1

1 STANDARD HOPPER NO. 1

(For parts supplied in small totepans)

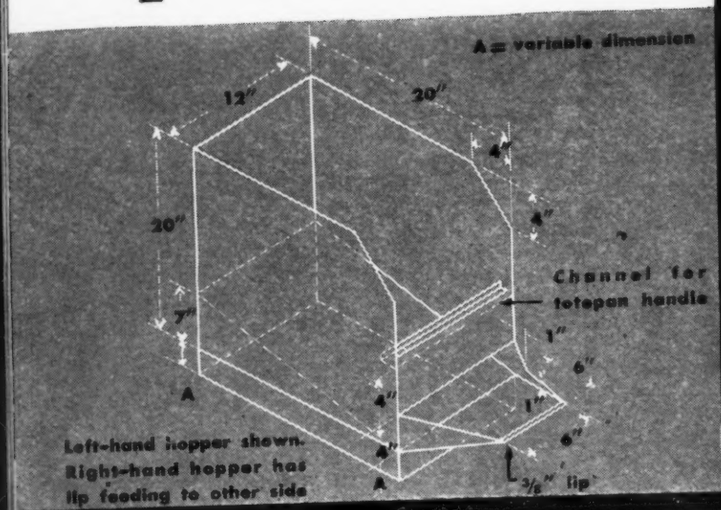
Floor type—front loading—slide feed

CAPACITY: 3300 cu. in.—2 small totepanfuls

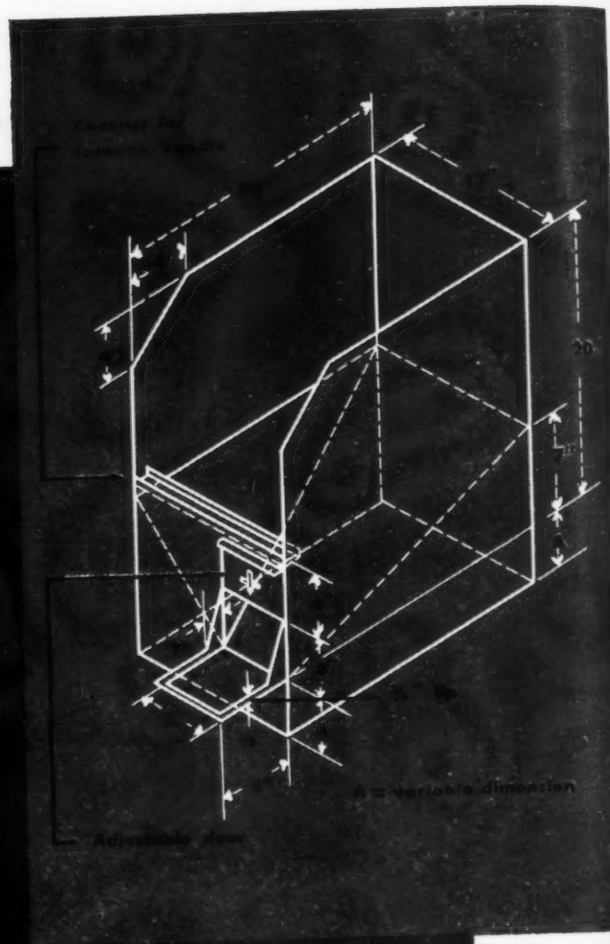
USES: This hopper is especially adapted for use on punch presses in conjunction with a standard punch press tray. Used successfully on practically all parts handled in small totepans

CONTINUED ON NEXT PAGE

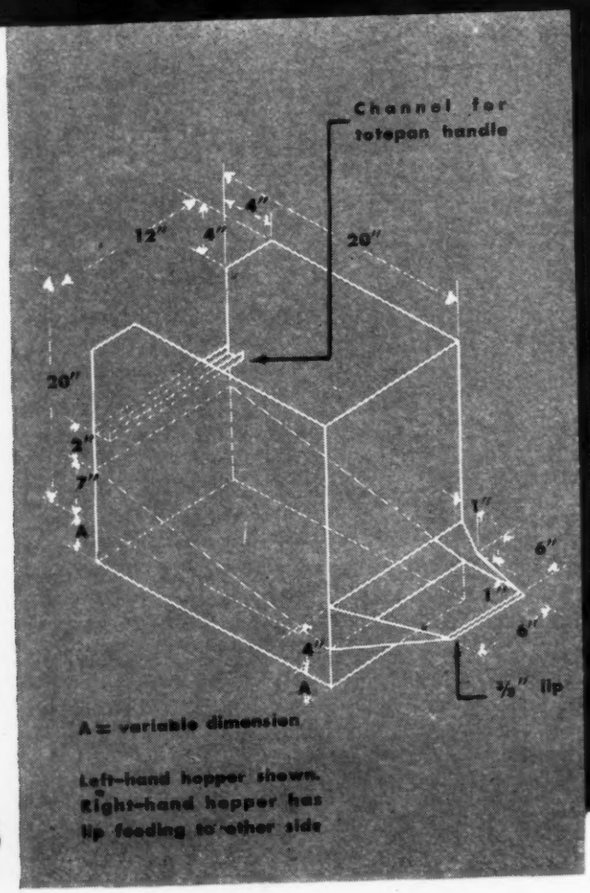
2


A = variable dimension
12"
20"
4"
4"
20"
7"
A
Channel for
totepan handle
1"
6"
4"
1"
4"
6"
A
3/8" lip
Left-hand hopper shown.
Right-hand hopper has
lip feeding to other side

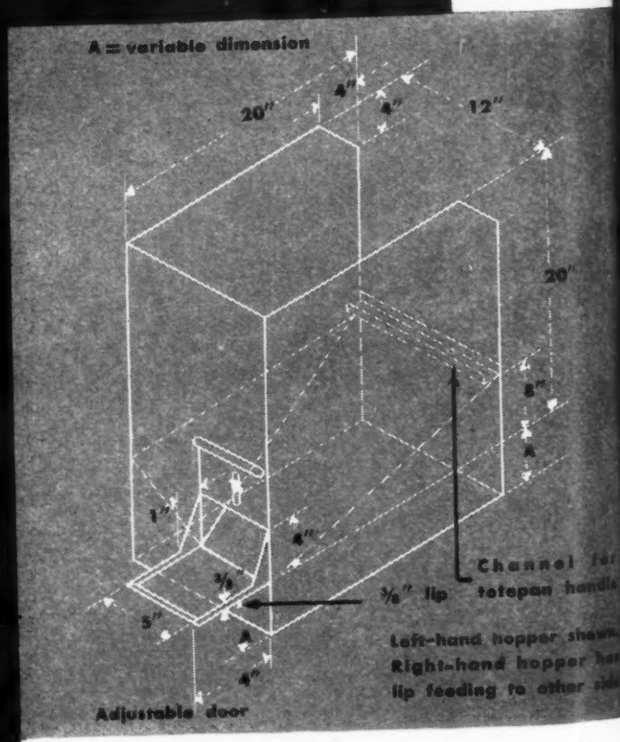
3


20"
A = variable dimension
Adjustable door

5


Channel for
totepan handle
12"
4"
4"
20"
20"
2"
7"
A
1"
6"
1"
6"
4"
A
3/8" lip
A = variable dimension
Left-hand hopper shown.
Right-hand hopper has
lip feeding to other side

6


A = variable dimension
20"
4"
4"
12"
20"
8"
A
1"
4"
3/8"
3/8" lip
Channel for
totepan handle
5"
A
4"
Adjustable door
Left-hand hopper shown.
Right-hand hopper has
lip feeding to other side

2

STANDARD HOPPER NO. 2

(For parts supplied in small totepans)

Bench type—front loading—wide front feed

CAPACITY: 3300 cu. in.—2 small totepanfuls

USES: This type of lip is especially adapted to relatively large parts and to parts that tangle

STANDARD HOPPER NO. 3

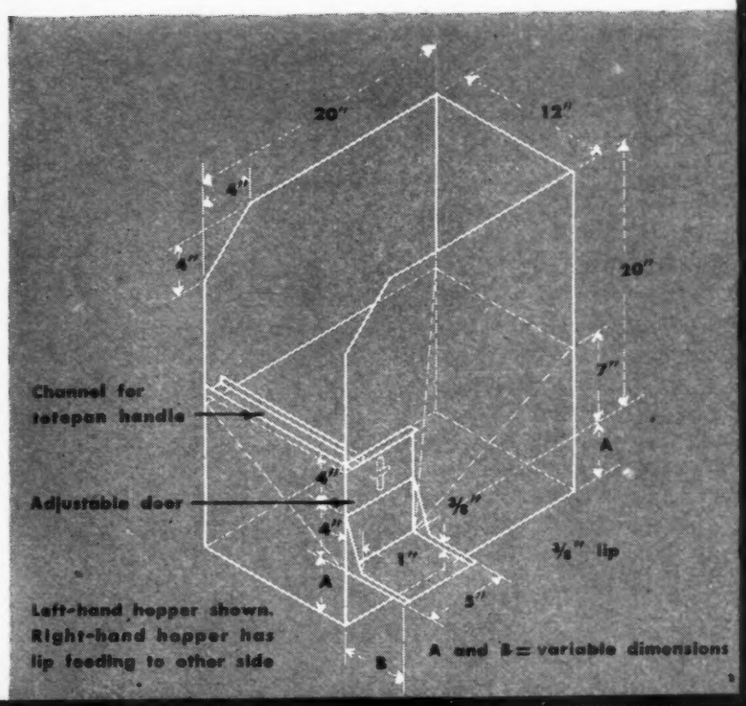
(For parts supplied in small totepans)

Bench type—front loading—wide front feed

CAPACITY: 3300 cu. in.—2 small totepanfuls

USES: This type of lip is especially adapted to relatively small parts that will not tangle

4



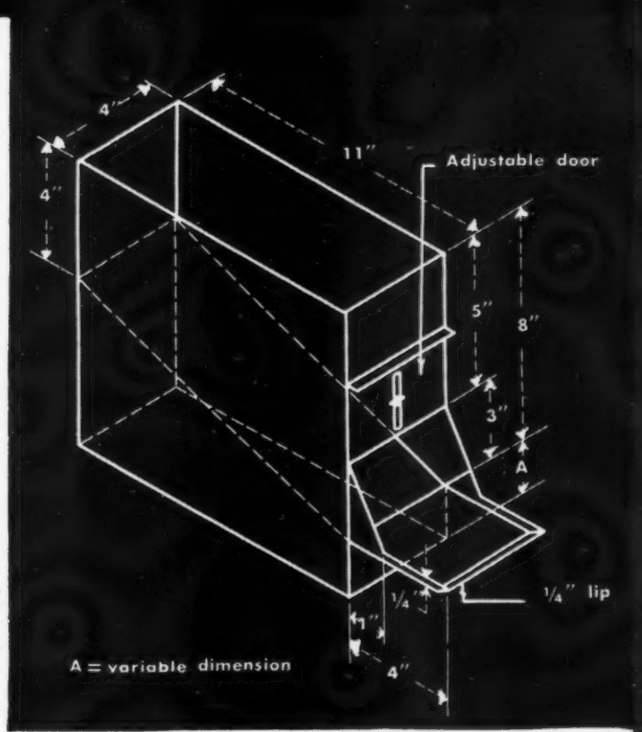
STANDARD HOPPER NO. 4

(For parts supplied in small totepans)

Bench type—front loading—narrow side feed

CAPACITY: 3300 cu. in.—2 small totepanfuls

USES: This type of lip is especially adapted to relatively small parts



7

STANDARD HOPPER NO. 5

(For parts supplied in small totepans)

Bench type—rear loading—wide front feed

CAPACITY: 2640 cu. in.—1½ small totepanfuls

USES: This type of lip is especially adapted to relatively large parts that tangle

STANDARD HOPPER NO. 6

(For parts supplied in small totepans)

Bench type—rear loading—narrow front feed

CAPACITY: 3300 cu. in.—2 small totepanfuls

USES: This type of lip is especially adapted to relatively small parts that will not tangle

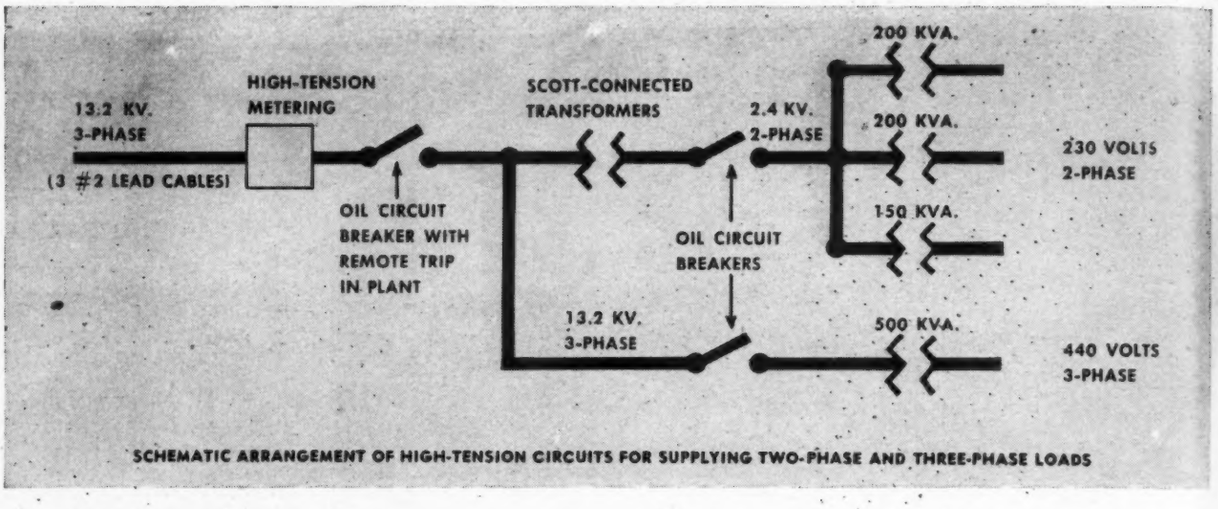
STANDARD HOPPER NO. 7

(For parts supplied in small totepans)

Bench type—front feed—breadpan

CAPACITY: 264 cu. in.—2 breadpanfuls

USES: This type of hopper is especially adapted to relatively small parts



SCHEMATIC ARRANGEMENT OF HIGH-TENSION CIRCUITS FOR SUPPLYING TWO-PHASE AND THREE-PHASE LOADS

CHOSE HIGH-TENSION SERVICE TO SOLVE POWER PROBLEM

JOHN CARNILA • CHIEF ELECTRICIAN, WILKENING MANUFACTURING COMPANY PHILADELPHIA

Should we patch up the electrical distribution system to take on new load? Many a plant answers that question by going ahead and patching when analysis of prevailing power rates would show a good profit in favor of a more extensive revamping than actually necessary —by bringing in higher voltage transmission.

Case in point is found at Wilkening, Philadelphia piston ring manufacturer. This company faced a necessary expenditure of a good many thousands of dollars to serve a potential 500-kva. load increase from an existing 2400-volt system, or the alternative of spending about twice as much to bring 13.2 kv. into the plant directly to the service transformers.

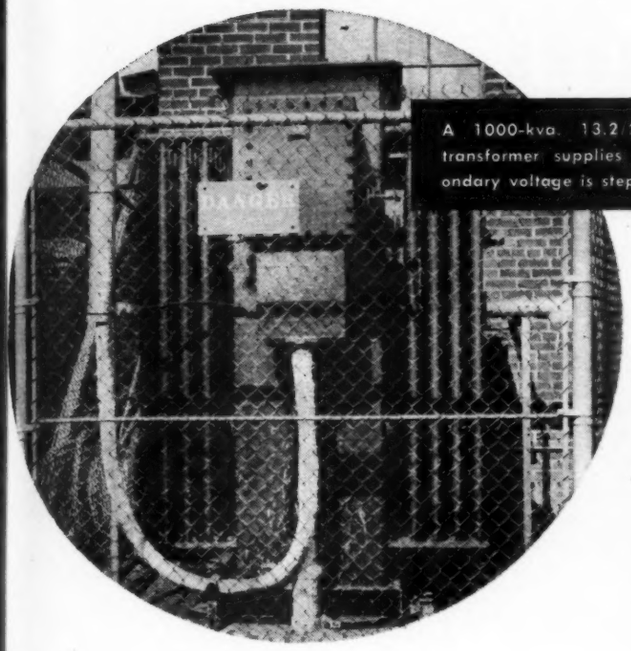
The latter choice now pays off at a calculated saving based on actual loads of around $250 a month, on a total power bill that averages more than $2000. The saving comes about through a rate difference earned by metering the supply at 13.2 kv. High-tension service has an average cost of about 5½ mills per kilowatt-hour, as compared with about 7½ mills for the 2400-volt supply.

Particulars of the installation are interesting in that main shop power distribution is 220 volts two-phase with a transformer capacity of 550 kva. It was considered highly desirable to supply the new load at 440 volts three-phase, and to install 500 kva. of transformer capacity to serve present and future loads with three-phase energy.

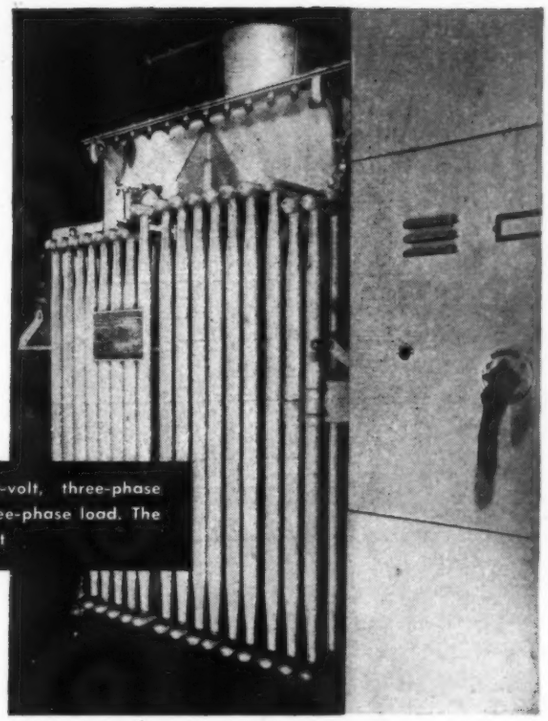
Reinforcement of the 300,000-cir. mil overhead 2400-volt system would have been inevitable, with new metering and breaker protection as well as a new 500-kva. three-phase transformer. By providing for high-tension metering and distribution at 13.2 kv., a single set of No. 2 lead cables in underground conduit supplies both the two-phase load, through Scott - connected transformers, and the new three-phase transformer.

Realized reduction in costs indicates that the extra investment for high-tension distribution will be paid off by the saving in about three years, or even in somewhat less time if factory production continues at its present high rate. Furthermore, any new additions to the three-phase system will come on at the lower rate now in effect and increase the actual advantages of the high-tension rate.

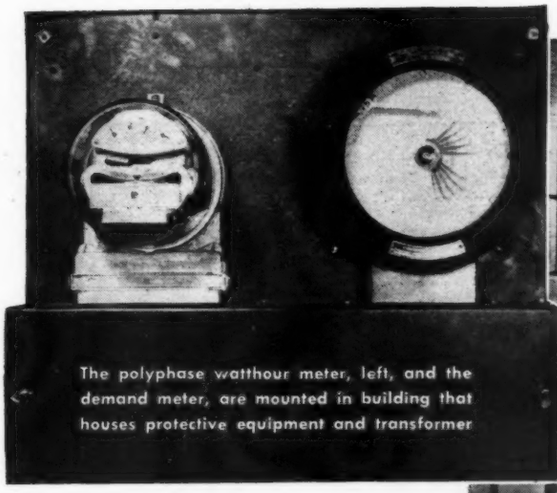
As a corollary, Wilkening now has a neat new underground installation, with no heavy overhead live conductors, that can be extended readily at little cost as the two-phase to three-phase change-over gradually progresses or as new loads come on.



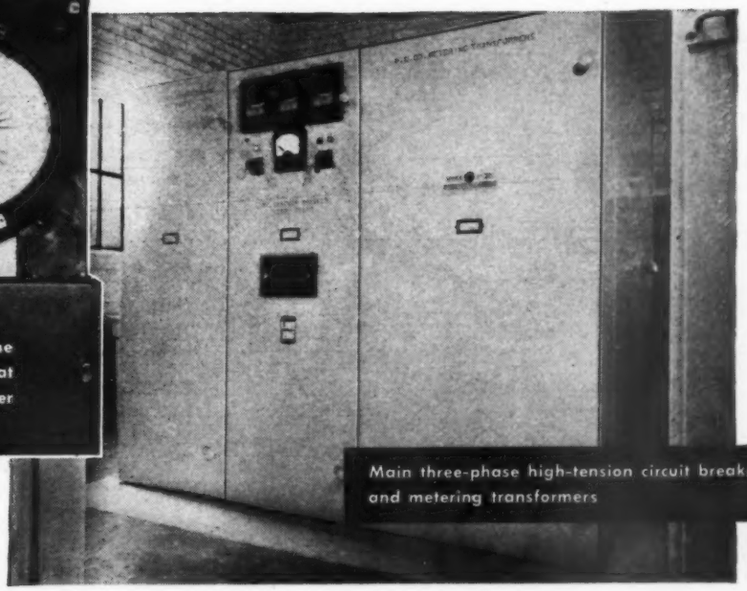
A 1000-kva. 13.2/2.4-kv. Scott-connected transformer supplies two-phase loads. Secondary voltage is stepped down to 230 volts



A 500-kva. 13,200/440-volt, three-phase transformer carries the three-phase load. The circuit breaker is at the right



The polyphase watthour meter, left, and the demand meter, are mounted in building that houses protective equipment and transformer



Main three-phase high-tension circuit breaker and metering transformers

A SIMPLE WAY TO FIGURE MACHINE DOWNTIME

DALE JONES • SENIOR INDUSTRIAL ENGINEER, JOHNS-MANVILLE CORPORATION, MANVILLE, N. J.

Interference occurs when a machine is non-productive because the operator is tending another machine. When one operator tends two or more machines which have irregular downtime, the running time cannot be coordinated, and interference must be tolerated.

The question of just how much time allowance should be granted for idle time caused by interference is generally a mystery. Interference is unpredictable, variable, and often spasmodic. Its correct evaluation requires some means of measure that will embody these uncertain characteristics. The laws of probability provide us with such a measure.

When all participants for chance happenings have equal opportunity for various occurrences, the distribution of such occurrences can be definitely determined with the laws of probability. When one operator tends two or more like machines having the *same* unpredictable downtime, the above circumstances exist. Interference, then, can be determined by factoring interference waiting time into the distribution of occurrences of downtime determined statistically by the laws of probability.

A mathematical method of determining interference is presented in this article. It provides a convenient means of preparing wage incentive curves for interference conditions.

Two of the laws of probability are used to great advantage in developing the mathematical method of interference determination. These laws are as follows:

1. If any event is given the opportunity to occur or not to occur, the sum of the probabilities of the possible occurrences must be unity. In other words, the sum of the probabilities of occurrence and failure of occurrence of downtime for a given machine is equal to unity.

2. If any event is given the opportunity to occur or not to occur, the probabilities of the possible occurrences will be distributed according to the terms of a binomial expansion.

The last mentioned law of probability, dealing with the expansion of $(d+r)^n$ is the backbone of the mathematical method of computing interference. A simple example of the application of this law is as follows:

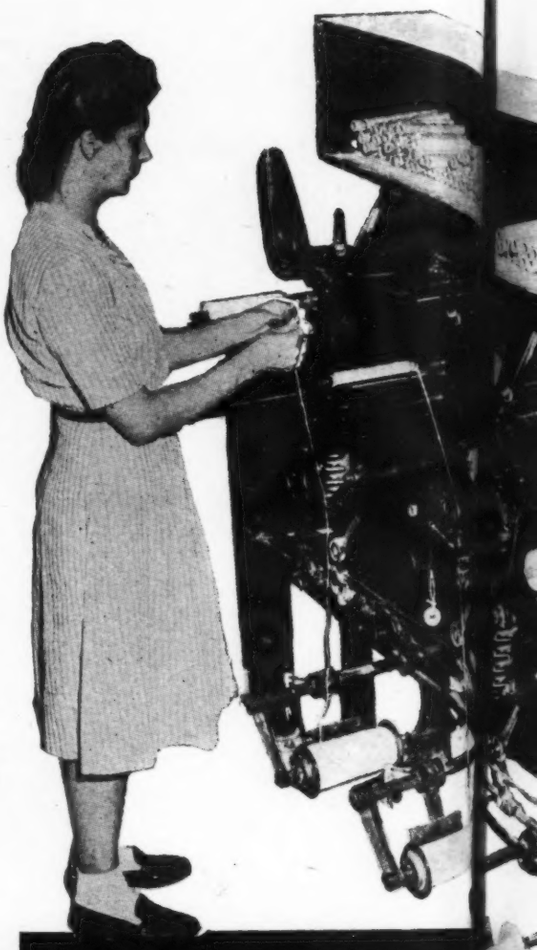
In rolling a die, it is known that an ace will turn up an average of once per six rolls. Also, a non-ace will be rolled an average of 5/6 of the time. Applying the expansion of $(d+r)^n$, the average distribution of aces when two dice are rolled together can be found. Substituting in this expression: d, the probability of occurrence of an ace = 1/6; r, the probability of occurrence of a non-ace = 5/6; and ^{n}, the number of simultaneous occurrences or failures (the number of dice) = 2. The expansion, then, is as follows:

$(1/5 + 5/6)^2 = 1(1/6)\ (1/6) + 2(1/6)\,(5/6) + 1(5/6)\,(5/6) = 1/36 + 10/36 + 25/36$

AVERAGE DETERMINED

It can be seen from this distribution that two aces will turn up an average of 1/36 of the time. Also, an ace and a non-ace will be rolled an average of 10/36 of the time. During the remaining 25/36 of the time, two non-aces will be rolled.

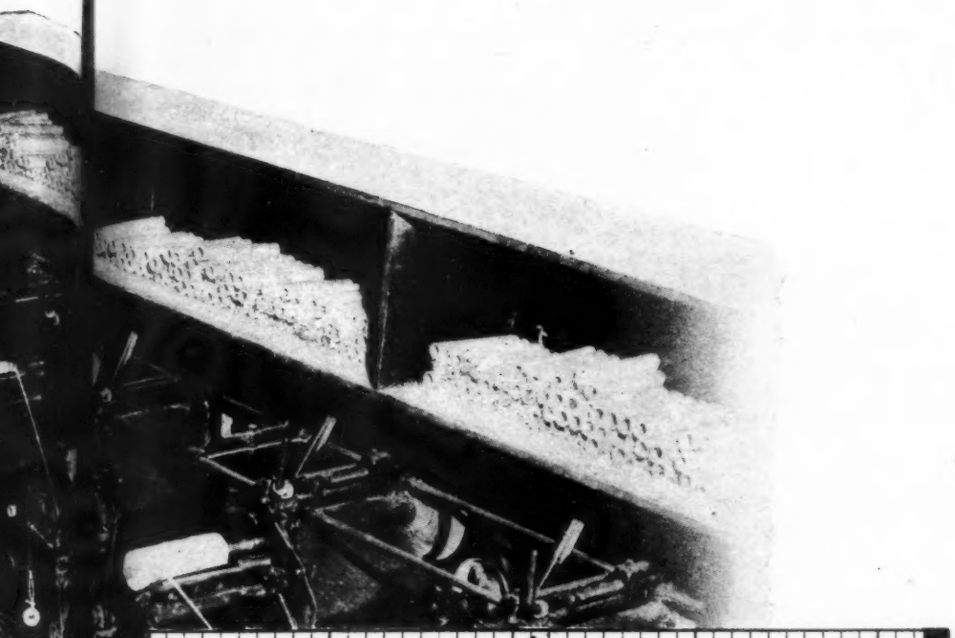
This distribution of occurrences



Interference downtime—while operator tends one element of multi-spindle machine, another lies idle

Figure 1. All the possible combinations of two dice. Over a long period of time, each of these combinations will appear, on the average, once in each 36 throws. Note pair of aces once, single aces 10 times

Figure 2. General binomial expansion and coefficient sums. Terms of specific expansions appear in form *a/b*. Meaning—on the average, combination represented will appear *a* times in *b* opportunities



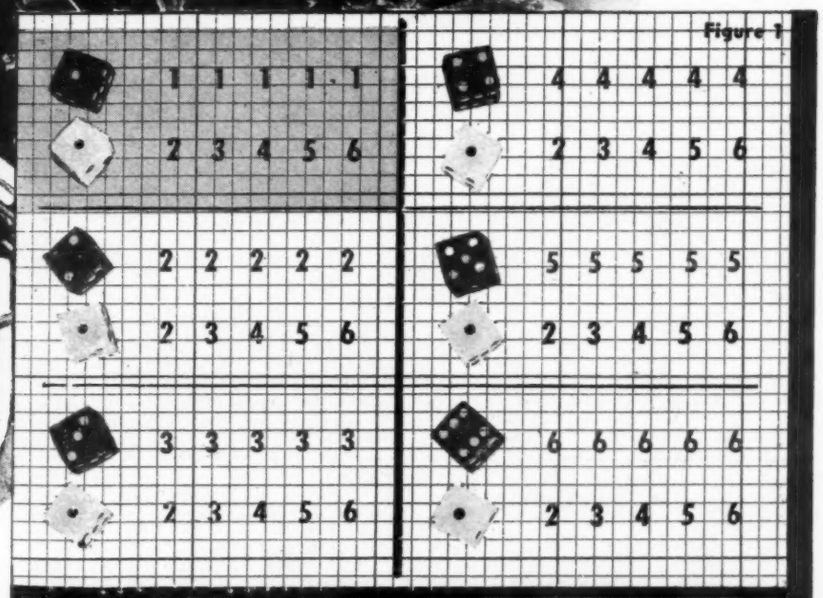


Figure 1

$$(d + r)^n = d^n + nd^{n-1}r + \frac{n(n-1)}{2} d^{n-2}r^2 + \frac{n(n-1)(n-2)}{2 \times 3} d^{n-3}r^3 + \ldots \text{etc.} \ldots + r^n$$

n					Coefficient Sums						
1	1										
2	1	2	1								
3	1	3	3	1							
4	1	4	6	4	1						
5	1	5	10	10	5	1					
6	1	6	15	20	15	6	1				
7	1	7	21	35	35	21	7	1			
8	1	8	28	56	70	56	28	8	1		
9	1	9	36	84	126	126	84	36	9	1	
10	1	10	45	120	210	252	210	120	45	10	1

Figure 2

may be proved in a different manner. On the average, 36 tosses of two dice will give exactly the combinations shown in Figure 1. Note that there would be an average of one pair of aces 1/36 of the time, one ace and one non-ace 10/36 of the time, and two non-aces 25/36 of the time, exactly the distribution predicted by the expansion.

FORMULA APPLIED

Applying this binomial expansion to the general theory of machine interference, if d represents the probability of occurrence of downtime, r the probability of failure of the occurrence of downtime, and n the maximum number of simultaneous occurrences or failures (the number of machines), then the probabilities will be distributed according to the terms of the expansion of $(d+r)^n$. The generalized expansion of this binomial is shown in Figure 2. The terms immediately preceding d in the expansion are known as "coefficient sums" and follow a definite pattern, also shown in Figure 2.

Before employing the expansion of $(d+r)^n$ in actual interference determination, it will be well to illustrate interference graphically. Certain features can then be observed, facilitating an understanding of the mathematical method of interference computation.

In Figure 3, the darkened time increments represent the occurrence of man-time. The shaded time increments denote consequent interference downtime resulting from two or more machines being down simultaneously.

Man-Time. Man-time determines the magnitude of interference for a given bank of machines. In this discussion it will represent machine non-producing time or downtime *during which the services of the operator are required.* This of course does not include shutdowns for lunch hour, recess, and abnormal delays.

In evaluating man-time, assume each machine is tended individually by an operator situated at a central location with reference to all of the machines in the group. Time spent in walking between the machine and the central location must be in-

cluded in the evaluation. The ratio of time to be spent in performing the man-time duties is the relevant factor in interference determination. A small change in man-time causes a great change in interference. Average man-time per machine must therefore be truly representative for accurate results in interference computation.

When one operator tends two or more machines having the same average man-time, the *average* duration of the man-time occasions is the same for each machine. By the same reasoning, the *average* interference per machine is the same. Since the chances of occurrence of downtime (man-time plus interference time) are the same for each machine, the distribution of such occurrences may be determined by the recently employed expansion of $(d+r)^n$.

In Figure 3, note that the total interference is equal to the sum of the downtime increments in excess of one in each of the instances where interference occurs. Each probability of occurrence of downtime d in the expansion of $(d+r)^n$ must therefore be multiplied by one less than the number of machines involved in that probability. If downtime d must represent man-time plus interference time, it appears that interference must be known to compute interference. Actually, interference must be estimated for use in d. If, then, the interference computed agrees with the estimate, the true interference has been found. Otherwise, revised estimates must be made, and the problem reworked until agreement is reached. This is known as the "method of successive approximations."

To illustrate the process involved, a typical problem is worked out in Case 1 on the next page.

The mathematical method of computing interference is a lengthy task, especially when one has little or no idea of what interference estimate to use initially. For this reason, interference values for groups of 2 to 20 machines have been determined and are shown in the table of averages on page 121.

All that is needed to determine interference with the table is man-time per machine and the number of machines tended by the operator. In Case 1, for example, one operator tended eight machines, each having 7 percent normal man-time. Referring to the table, it is seen that 7 percent "Man-time per Machine" in the left column gives 2.6 percent interference per machine in the column for eight machines.

A somewhat more complicated problem is worked out in Case 2. By the method employed in this problem, the table can be conveniently used to draw up pay curves for various degrees of operator productive effort under interference conditions.

Studying interference conditions with small sand hoppers. Proper machine allocation and interference allowances resulting from these studies prevent operators becoming dissatisfied victims of "circumstance"

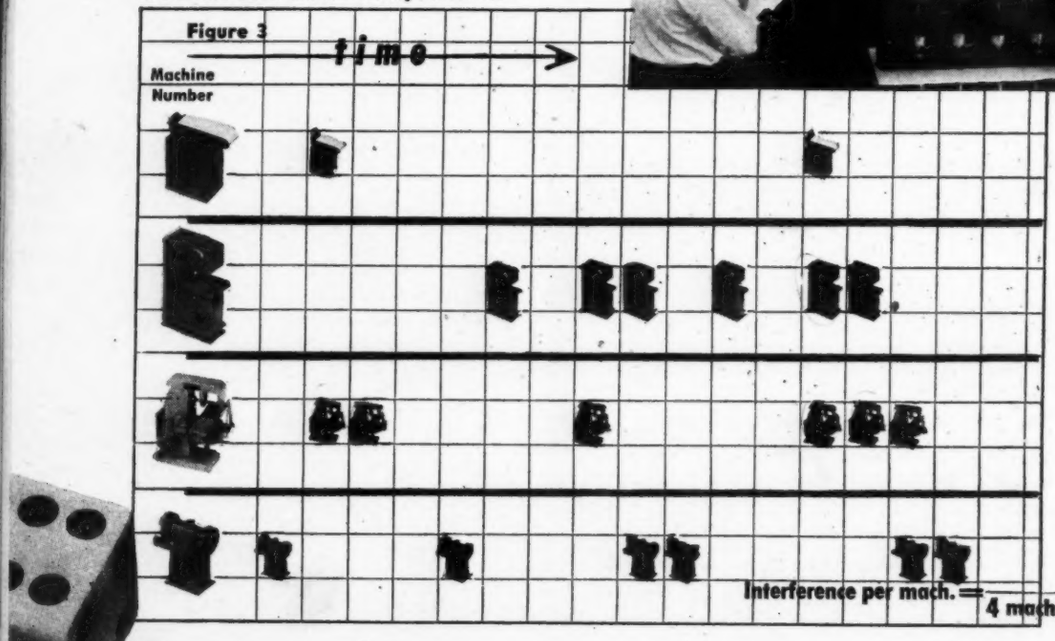


Figure 3. One operator tending four machines, and resulting interference downtime. Machines in black are down and are being serviced at time shown; those in blue are down *and are waiting for service*

percentage average interference per machine

% Man-Time per Machine	NUMBER OF MACHINES TENDED BY ONE OPERATOR																			
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	*	*	*	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
3	*	*	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
4	*	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.1	1.2	1.3	1.4	1.6	1.8	2.0	2.2	2.5	3.0
5	0.1	0.2	0.4	0.6	0.7	0.9	1.1	1.3	1.5	1.9	2.1	2.5	3.0	3.5	4.0	4.7	5.4	6.2	7.3
6	0.1	0.4	0.6	0.8	1.1	1.4	1.7	2.1	2.5	3.0	3.6	4.2	5.1	6.2	7.7	9.3	11.2	13.4	16.1
7	0.2	0.5	0.9	1.2	1.6	2.1	2.6	3.1	3.8	4.6	5.8	7.0	8.7	10.8	13.2	16.3	19.8	23.7	
8	0.3	0.7	1.1	1.6	2.2	2.8	3.6	4.5	5.6	6.9	8.6	11.2	14.0	17.7	21.4				
9	0.4	0.9	1.5	2.2	3.0	3.9	4.9	6.4	8.0	10.5	13.4	16.7	21.2						
10	0.5	1.1	1.9	2.8	3.9	5.1	6.5	8.4	11.1	14.6	18.8								
11	0.6	1.4	2.4	3.5	4.9	6.3	8.4	11.0	15.0	19.3									
12	0.8	1.7	2.9	4.3	6.1	8.0	10.7	14.2	19.5										
13	0.9	2.1	3.5	5.1	7.3	9.7	13.5	18.2	24.7										
14	1.1	2.5	4.2	6.1	8.8	12.1	16.8	23.7											
15	1.3	2.9	4.9	7.2	10.4	14.9	20.9												
16	1.5	3.3	5.6	8.6	12.2	18.0													
17	1.7	3.7	6.5	9.9	14.3														
18	1.9	4.2	7.4	11.4	16.5														
19	2.1	4.8	8.8	13.1	19.0														
20	2.3	5.3	9.4	14.9	21.7														

In evaluating "man-time," assume machines are tended individually by operator normally situated at central location with reference to all of the machines in the group

Sometimes complicated formulas and tedious mathematical figuring are entirely eliminated with the aid of this table. For banks of machines or for groups of machines, each having the same "percent man-time," interference values can be read directly. Asterisks (*) indicate less than 0.05 percent interference; figures printed in reverse refer to Case No. 2

CASE I

PROBLEM: One operator tends eight machines. Each has an average of 7 percent normal man-time. Determine the interference per machine when the operator is working at a normal pace.

SOLUTION: Estimate the interference. Suppose that estimate is 2.6 percent. Since interference was neglected in determining man-time, an adjustment must be made before proceeding. The *actual* ratio of man-time to total time is man-time times one minus estimated interference, or 0.07 (1-0.026) = 0.0682. Since downtime d is man-time plus interference time, $d = 0.0682 + 0.026 = 0.0942$; running time $r = 1 - d$, or 0.9058; and the number of machines $n = 8$. Now $(d + r)n$ is expanded, and waiting time factored in.

No. Machines Down Together	Coeff. Sums		(d)		(r)		Waits		Interference
8	1	x	$(0.0942)^8$			x	7		*
7	8	x	$(0.0942)^7$	$(0.9058)^1$		x	6		*
6	28	x	$(0.0942)^6$	$(0.9058)^2$		x	5		*
5	56	x	$(0.0942)^5$	$(0.9058)^3$		x	4	=	0.001
4	70	x	$(0.0942)^4$	$(0.9058)^4$		x	3	=	0.011
3	56	x	$(0.0942)^3$	$(0.9058)^5$		x	2	=	0.058
2	28	x	$(0.0942)^2$	$(0.9058)^6$		x	1	=	0.138
1	8	x	$(0.0942)^1$	$(0.9058)^7$		x	0		*
0	1	x		$(0.9058)^8$		x	0		*
								Total	0.208

* Less than 0.0005

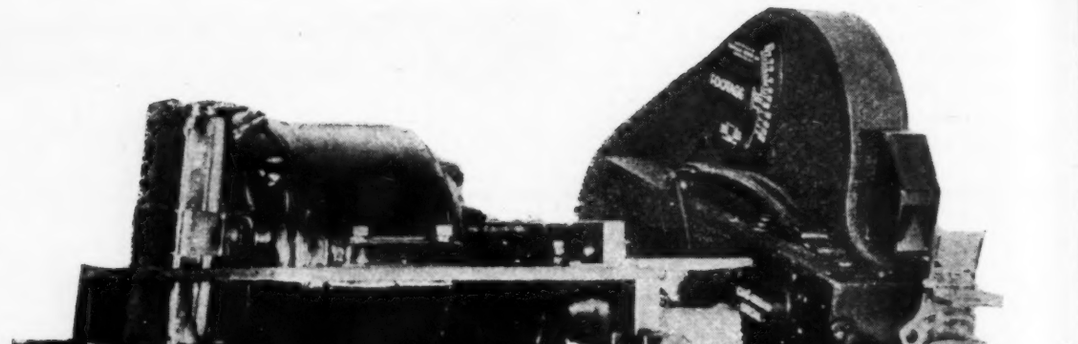
If the *total* interference is 20.8 percent, certainly the average interference time per machine is 20.8 divided by the number of machines—eight. This gives a value of 2.6 percent for interference time. Since the computed value agrees with the estimate used, it is the true interference.

CASE II

PROBLEM: One operator tends six machines, each of which requires an average of 12 percent normal man-time. Determine the interference per machine. What is the interference per machine when the operator's productive effort is 120 percent, instead of normal? Also, determine the machine utilizations for the two productive efficiencies under consideration.

SOLUTION: In the first case, locate 12 percent in "% Man-Time per Machine" column of the table, and read 6.1 percent interference per machine in the column for six machines. When the operator works at 120 percent efficiency, the man-time per machine becomes 12/120, or 10 percent. Ten percent man-time per machine for six machines, however, causes 3.9 percent interference per machine as shown in the table.

Machine utilization is equal to unity minus (man-time plus interference). When the operator works at normal, then utilization per machine is 100 - (12 + 6.1) or 81.9 percent. When he works at 120 percent, the utilization per machine is 100 - (10 + 3.9), or 86.1 percent. Thus, a 20 percent increase in the operator's productive effort caused an increase in machine utilization of only 5 percent.



Time study men are no longer "outcasts" since a plant-wide normal supplanted individual judgment at Minneapolis-Honeywell

SETTING WORKER-NORMALS FOR TIME STUDY PURPOSES

W. B. WISECARVER • TIME STUDY ENGINEER, MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, MINNEAPOLIS

How to unify the thinking of the time study engineers on the all-important question, "What is *normal?*" That was the problem faced by management—no less than by the time study department—at Minneapolis-Honeywell.

Unwilling to accept the limitations of the usual definition that "a normal day's work is the amount of work produced by a normal operator working under normal conditions," M-H now combines the talents of a synchronized high-speed motion picture camera and about 40 non-time-study employees to provide what it believes to be a more-than-acceptable solution.

Basically, time studies are used to establish time standards, and time standards, in turn, are used to establish base costs. The eventual selling price of any article is, of course, hinged directly to base cost. It is obvious that the interrelation between the time consumed in making an article and the selling price of that article is a key factor in the profit-and-loss statement of a manufacturing concern. If the time standards are too high—if too much time is allowed for the production of each piece—the base cost will be high, and in all likelihood the completed article will not be able to sell in competition on the open market. Conversely, if the time standards are too low, labor will soon become dissatisfied, placing the employer in an untenable situation.

WHY NECESSARY

Thus a proper time study procedure is important on two counts—(1) it is essential to the establishment of selling price; and (2) it is vital to healthy industrial relations.

Time standards are the result of time studies taken of an operation with a stopwatch. These time standards include such detail as repetitive elements and intermittent elements of work, whose times are determined directly by stopwatch readings. Added to these elemental times are allowances based on minutes per day, and calculated per piece. Allowances include fatigue, personal, and minor delay factors.

However, before these time standards can be applied to give a true picture of costs and performances, the elemental times must be corrected to normal. The operational device by which this is accomplished is known as a leveling factor.

However, there is no simple formula that can be applied as a leveling factor. At Honeywell, the term "effective performance" is used to indicate the speed, effort, or skill being applied by the operator *at the time of the study.* Effective performance is the result of the combi-

nation of these things in an operator which make him more or less effective than the normal operator.

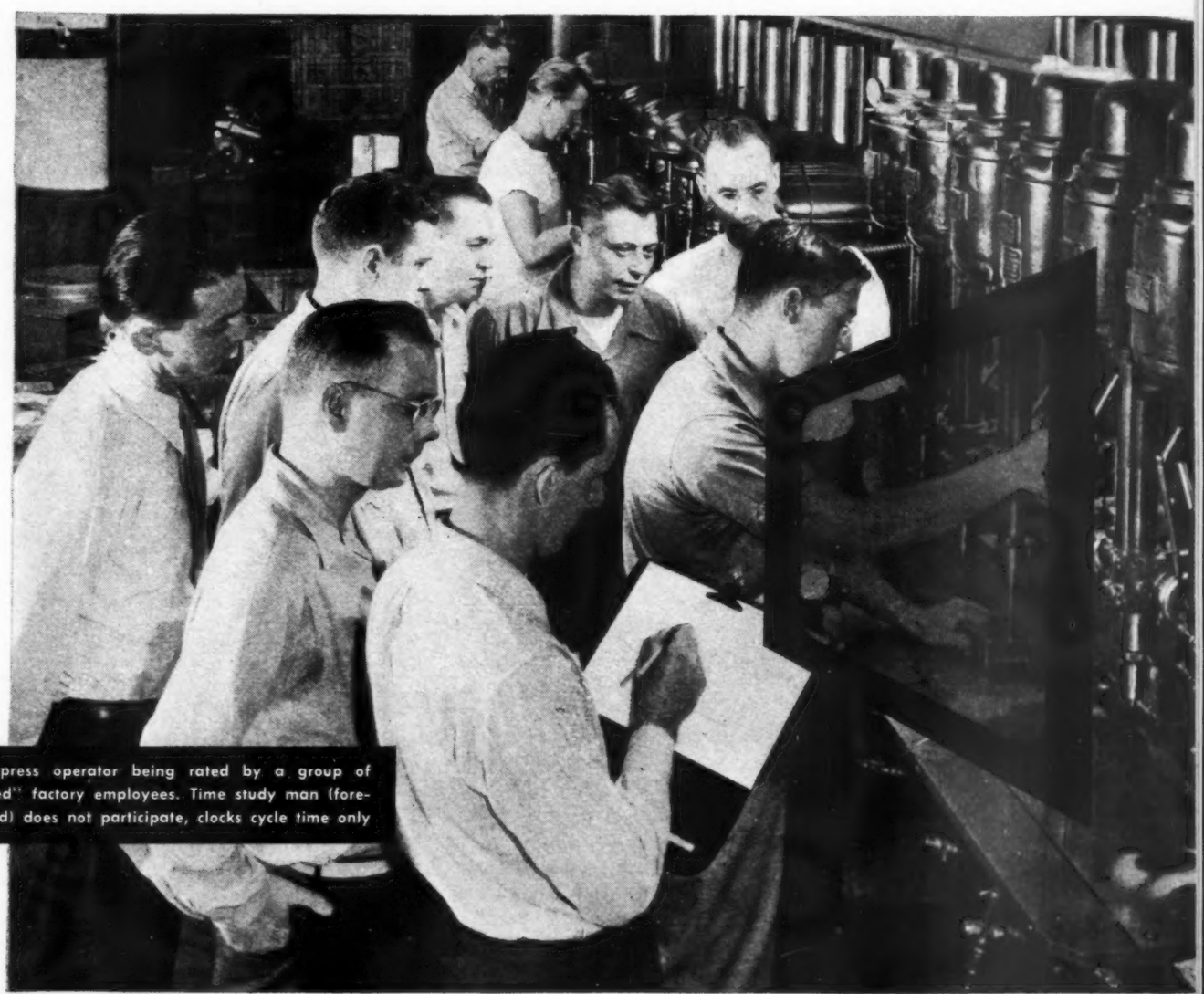
This still leaves unanswered the question, "What is normal?" No all-seeing machine, no single time study expert, no factory worker can say what normal is. Normal to one person may be 100 parts an hour; to another person, 80 parts an hour; and to a third, 130 parts an hour. And yet it is perfectly possible that all three of these people would be producing 100 parts an hour *at the time of the study*. These apparently similar paces must be "leveled" to reflect the true normal productive rate of each operator.

Industry and labor have to depend on the judgment of the time study engineer for the proper use of this leveling factor. Most time study men have developed their own concept of normal through experience and practice. However, when they apply their judgment, they are affecting labor cost, planning of work, and the individual or departmental results obtained from the application of the time standards they have established. It is obvious, therefore, that for time standards to be meaningful, they must be based upon a *uniform* concept of normal.

The manner in which this was achieved at Honeywell can be applied to any type of industry, with consistent and equitable results. Here's how it was done:

Until a year and a half ago, an artificial leveling factor was employed to normalize a time study. At that time it was agreed that this factor was limited in its application, and certainly did not produce consistent results. Individual concepts caused unexplained variances between operations and departments. As a result, operators were becoming discouraged and foremen were developing a definite opposition to all time standards, as well as to the time study men.

A university consultant was called in to help determine what type of leveling factor could be used to obtain the results wanted. He pointed out and demonstrated that any *group* of intelligent people had, collectively, a good concept of normal



Drill press operator being rated by a group of "mixed" factory employees. Time study man (foreground) does not participate, clocks cycle time only

on any simple operation. Also, that it was not too difficult to correct for the few exceptions to the average of the group.

First move was to put into use a leveling factor based upon a "normal" of 100 percent, with operators rated in increments of 5 percent from this base. The raw time taken from the actual watch readings is leveled by multiplying by this factor. In this manner the shorter time of the more effective operator is lengthened, and the longer time of the less effective operator is shortened, both to the point of normal time.

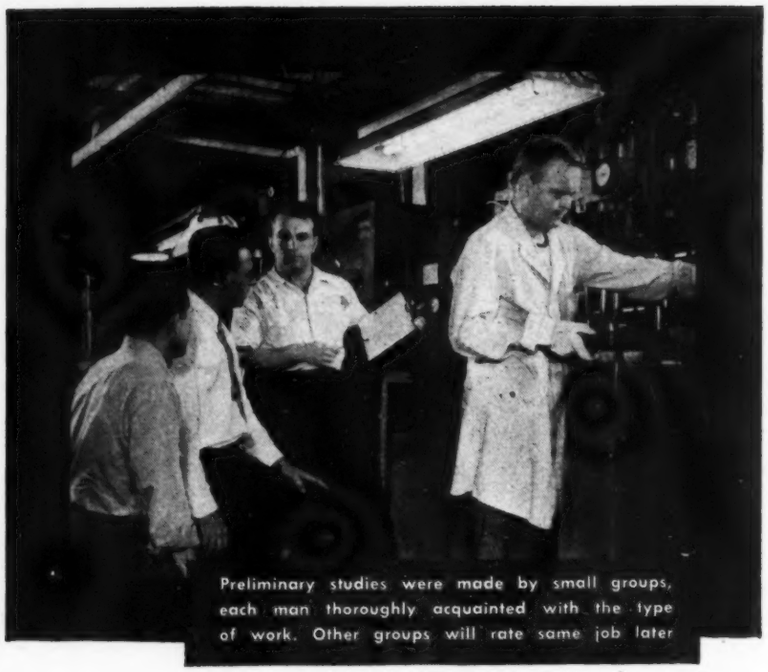
STEWARDS INCLUDED

Second step was to bring together a representative group to go down into a department and actually rate a series of jobs, using this new leveling factor. The group was not limited to time study and methods engineers—the factory superintendent, foremen, set-up men, group leaders, and union stewards were included. During the initial stages, only those well acquainted with a particular job were called upon to rate that job.

Ten to fifteen jobs were selected, and the operators were informed of the purposes of the program. They were asked to perform at a level of their own choosing, but to maintain that level as nearly as possible during the rating sessions.

The rating group was then divided into smaller groups of approximately three persons each. They were usually mixed up so that a foreman, a set-up man, and an engineer were in the same group. They were requested to rate the jobs privately, and not to discuss or disclose to the others how they had rated any particular job until the session was concluded. A time study man was stationed on each job to record cycle times so that any differences in the performance of the operator, from group to group, would be noted and corrections made for it.

These ratings were purely the rater's own conception of what he thought the operator was doing in terms of effective performance, expressed as percentages of 100, which represented normal. The group's ratings for each operation were averaged, and the average rating was considered the probable correct rating for that operation. On analysis, it was discovered that 75 to 80 percent of the ratings were within 5 percent, plus or minus. In general, only 2 or 3 percent of the ratings were more than 10 percent off.



Preliminary studies were made by small groups, each man thoroughly acquainted with the type of work. Other groups will rate same job later

After checking all the results of these preliminary studies, a group of about 40 people—representing both the operating departments and the methods department—were selected to go through a variety of operations to see how closely they could rate on types of work other than that on which they had had experience.

MANY JOBS RATED

Each day a variety of jobs was rated. The foreman would consult each operator and enlist his support for the trials. The group was broken down into smaller groups of about five or six each, and they were sent to jobs in various departments to avoid waiting for each other and to prevent confusion in any one department. Usually about two jobs were selected in a department, and seven or eight departments were covered each day. The groups were repeatedly brought back to the same department to rate different operations until virtually every type of work done in the plant had been covered.

The purpose of these studies was twofold—to discover whether there was a difference in the thinking of people working with machine operators and those working with assembly operators; and whether machine personnel could rate assembly operations accurately and *vice versa*.

The final results from these sessions proved that almost any *group* of intelligent people could be taught to judge an operator's performance, particularly when the operator was performing close to normal. It was found that when the work was performed at normal or within plus or minus 20 percent of normal, these people nearly always agreed as to the proper rating. But when performances got higher or lower than this, judgments began to vary and the ratings were far less consistent.

Upon checking the time of these extremely fast or slow operations against the more normal operations, it was found that the raters had a distinct tendency not to rate as high as they should on fast performances, and to rate too high on slow performances. It should be kept in mind, however, that many of these

Rating of Films by a Selected Group

Effective performance ratings (EPR) were estimated by participating personnel. The results are shown in the table below

Type of Work	No. of Raters	Actual E.P.R. %	Group Results: Within 5%	5% to 10%	Over 10%	Comments
1A Hand screw mach.	39	100	30	8	1	38 raters, or 97%, were within 10%
1B Hand screw mach.	39	65	3	3	33	33 raters, or 85%, were more than 10% too high
1C Hand screw mach.	39	130	6	2	31	31 raters, or 80%, were more than 10% too low
2A Punch press	39	105	32	6	1	38 raters, or 97%, were within 10%
2B Punch press	39	70	11	8	20	51% of the raters more than 10% too high
2C Punch press	39	125	18	14	7	32 raters, or 82%, were within 10%–18% too low
3A Milling machine	39	100	27	7	5	34 raters, or 87%, were within 10%
3B Milling machine	39	130	16	7	16	23 raters, or 59%, were within 10%–41% too low
3C Milling machine	39	80	16	10	13	26 raters, or 67%, were within 10%–33% too high
4A Drill press	39	105	35	4	0	100% within 10%
4B Drill press	39	120	23	9	7	82% within 10%–18% too low
4C Drill press	39	65	6	5	28	72% more than 10% too high
5A Assembly	39	110	25	8	6	85% within 10%
5B Assembly	39	165	0	0	39	100% more than 10% too low
5C Assembly	39	70	14	7	18	54% within 10%–46% too high
6A Assembly	39	100	35	3	1	97% within 10%
6B Assembly	38	115	27	9	2	95% within 10%
6C Assembly	38	80	23	14	1	97% within 10%
7A Assembly	39	105	37	2	0	100% within 10%
7B Assembly	39	125	9	13	17	56% within 10%–44%
7C Assembly	39	95	31	5	3	10%
8A Assembly	38	100	34	3	1	10%
8B	38	130	2		33	10%
8C	38	60	3		33	

people had never rated before, and that many of them had never before seen the work they were asked to rate. While an improvement has been noted with continued practice, it is felt improbable that any *one* person will ever be able to rate *every* job with absolute certainty.

The group of raters used thus far had demonstrated their ability to do a fair and consistent job of "defining" normal, so it was decided that their concept should be adopted as the Honeywell concept. But it was impractical to call upon the services of so large a group every time a time study had to be made. So the problem arose of how to indoctrinate the time study engineers in this new "Honeywell normal." The solution was provided by a motion picture camera.

While the initial rating sessions were being carried on, motion pictures were taken of varied operations scattered throughout the manufacturing and assembly departments. Operators were requested to work at their idea of normal, fast, and slow paces. The result was a series of motion pictures of operations, with three to five "takes" of the operation, each at a different tempo.

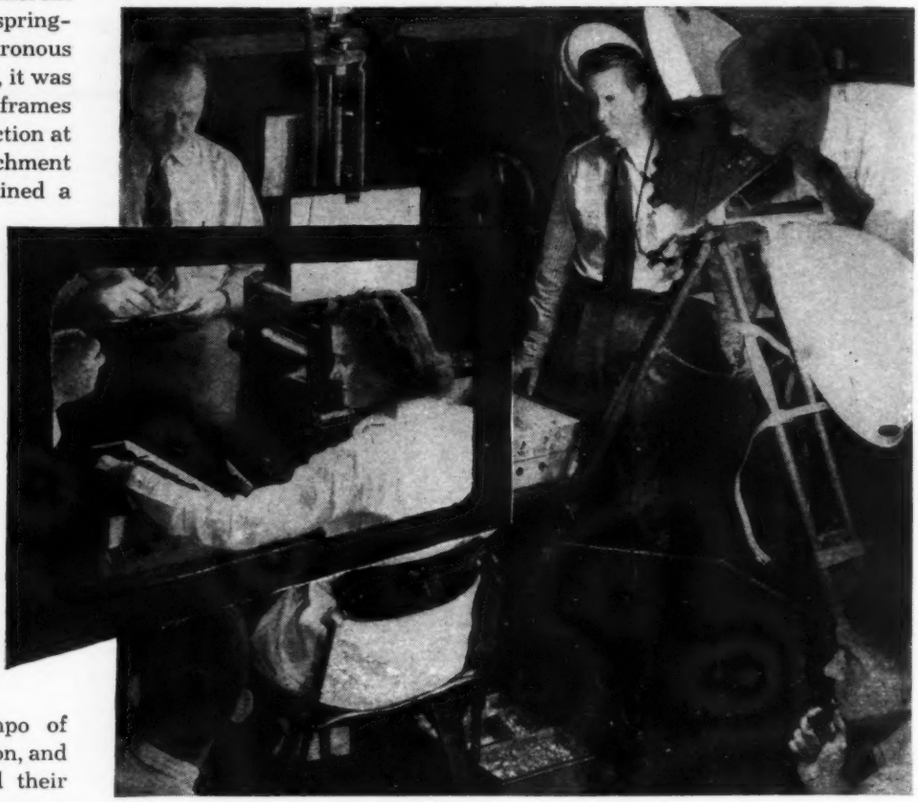
In order to take these pictures and project them exactly as they were

filmed, a special 16-mm. camera was needed, because of the inherent variations in speed of a spring-driven camera. With a synchronous motor mounted on the tripod, it was possible to film exactly 1000 frames per minute. To insure projection at the same speed, a panel attachment was developed which contained a stroboscope and frame counter. This made it possible to check cycle time not only by stopwatch, but also by actually counting the frames, each of which represented 0.001 minute.

The group of 40 people were then called together and shown the pictures. They were not told that the operator had been asked to work at a particular tempo; they were simply asked to rate what they saw.

After each "take," which represented one tempo of work, the lights were turned on, and the raters placed on a card their interpretation of the "effective performance" of the operator for that particular "take." This was done privately, and there was no discussion until after the series had been completed. No attempt was made to determine normal at this time, but the figures were available to determine what the proper time for the operation should be when a normal had been selected.

Motion pictures with a synchronized camera are taken right at the workplace. Operator is told to work at any speed desired, but to maintain even tempo



AVERAGES CALCULATED

After all the ratings had been completed, averages were calculated to determine which of the tempos seemed to be most thoroughly agreed upon. It was usually found that the performance closest to normal met with the most unified thinking of the group. If one of the "takes" was agreed upon as normal or 100 percent, then by using cycle times the proper "effective performance" ratings were determined for the other "takes" of that same operation.

Suppose the greatest unanimity had been found on a sequence in which the cycle time was 66 seconds, and that it was agreed that this represented 110 percent of normal. Then the cycle which required 60 seconds represented 100 percent, and so forth. Comparisons of the actual ratings against the "standards" established in this manner are shown in the table on page 125.

Proceeding in this way, a definite "percentage of normal" or "effective performance rating" was assigned to each of the film sequences. The pictures were then re-edited and cut down so that each "take" represented an individual roll with one single performance of an operator on each roll. *They were then used, and are still being used, as the means of training time study personnel to the Honeywell normal.*

The films are run over and over again—as many times as are required—until the trainee is able to recognize the Honeywell concept of normal. That is, until he says, "That is 110 percent effective performance," when he is shown a film of an operation that has been normalized to 110 percent. There is still the tendency to rate too low on fast operators and too high on slow operators, but M-H is convinced that its men know normal when they see it, and can rate accurately from 80 to 120 percent of normal.

FOREMEN HELPED

Recognizing this weakness has contributed materially to the success of the time study program at Honeywell. With the help of the foremen—who are aware of this tendency—it is usually possible to avoid studying extremely fast or slow operators. In most cases the foremen are able to put on the job to be studied an operator who will range between these points, and thereby help to obtain a better and more equitable study of the operation. Bringing the foremen into the initial phases of the program was no small help in enlisting their aid for this part of the work.

Honeywell looks forward to the day when it can discard its company-wide normal and—through cooperation with other companies—join in the introduction of an industry-wide "normal."

WAGE AND MERIT RATING STOPPED WAGE SQUABBLES

H. S. BOWN • MANAGER, INDUSTRIAL ENGINEERING DEPARTMENT
LAKE SHORE TIRE & RUBBER COMPANY, DES MOINES

Differences of opinion between management and union about wage rates have practically disappeared at Lake Shore since the installation of a job rating plan. But the greatest benefit has been the development of a tool that determines in a scientific manner the base rates of pay for all existing operations and a method for determining the proper base rate for any new or changed operation.

The plan of job rating was installed with the advent of synthetic rubber into the automobile tire manufacturing process. The changes in methods and procedures were so radical and sudden that piecework rates, which had been established for processes using natural rubber, became inoperative.

A provision in the local collective bargaining contract provided that when piecework rates were removed from an existing operation, the rate of pay would be the average hourly earnings of the operator for the last previous pay period. Most employees foresaw the situation and, by extra effort during the last days on piecework, were able to establish for themselves an abnormally high average which carried over into the new era.

In a very short time production on those operations, which were being paid for at the high, frozen average hourly earnings, dropped to the level or below the level normally to be expected on a regular daywork basis. Other operations not directly affected by changes in process were indirectly affected by interruptions in the continuous flow of materials necessary for efficient piecework standards, and they also were paid on the basis of previously earned high hourly averages.

This situation existed for about two years. Attempts were made by individual foremen to establish piecework rates in miscellaneous occupations by a process of collective bargaining, but this was successful in only a few cases and for short periods of time.

This was the situation that confronted the industrial engineer who assumed responsibility for restoring order to the wage structure. Job classification seemed to be the only answer.

The system evolved was adapted from the job classification plan developed by the National Metal Trades Association, using eleven essential factors taking into consideration skill, effort, responsibility, and job conditions.

Five different degrees for each of the eleven elements or essential factors were determined to be characteristic of every job. These degrees increase by steps according to the amount of the factor involved. A numerical value is assigned to the degrees, which advance progressively. The same point values are used throughout the entire job rating operation.

Only slight modifications were necessary in the wording of some of the factor degrees, but it was decided that the point values for the factors could not be improved upon.

The eleven factors used at Lake Shore are:

1. *Education,* which refers to the amount of basic education the job requires. The five degrees range from "Not necessary to read, write, or add and subtract" to "Requires education of a technical nature."

2. *Experience,* indicating the amount of time on like or related work usually required to enable an individual to perform the work satisfactorily and efficiently. Here the degrees run from "Up to one month" to "Three years."

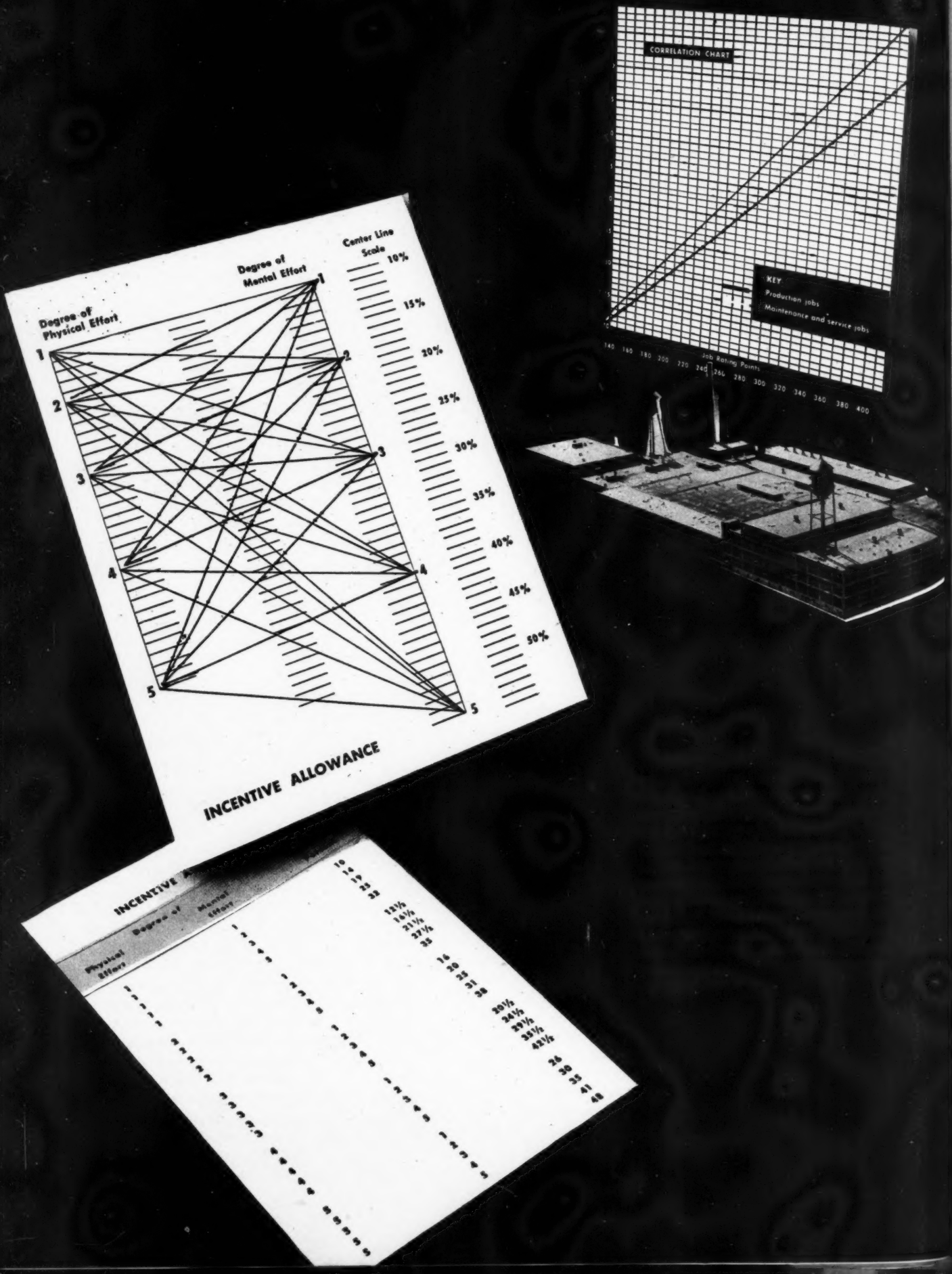
3. *Initiative and Ingenuity,* involving independent action, action of judgment, or making decisions. Degrees cover "Requires the ability to understand and follow simple instructions" to "Requires outstanding ability to think clearly, accurately and independently on complicated work."

4. *Physical Demand,* relates to the amount and continuity of effort required. "Light work requiring little physical effort" is the first degree; the fifth is "Continuous physical exertion with heavyweight material." Light weight is defined as under 15 pounds, heavy weight as over 75.

5. *Mental or Visual Demand,* relates to the amount or degree of mental or visual concentration required. The degrees range from "Practically automatic," the lowest, to "Concentrated and exacting attention," the highest.

6. *Responsibility for Equipment,* indicates in monetary terms how much the company stands to lose through damage. The high degree here is "Possible damage exceedingly high," ranging down to Degree 1, "No damage to equipment involved." Amounts of $25, $250, and $1000 are covered by degrees 2, 3, and 4.

7. *Responsibility for Material or Product.* The same values are ap-


CORRELATION CHART
KEY
Production jobs
Maintenance and service jobs
Job Rating Points
140 160 180 200 220 240 260 280 300 320 340 360 380 400
Degree of Physical Effort
Degree of Mental Effort
Center Line Scale
10%
15%
20%
25%
30%
35%
40%
45%
50%
1
2
3
4
5
INCENTIVE ALLOWANCE
Physical Effort
Degree of Mental Effort
12½
16½
21½
27½
35
15
20
25
31
38
20½
24½
29½
35½
42½
26
30
35
41
48

at Lake Shore

plied to loss of material or product as to equipment.

8. *Responsibility for Safety of Others* relates to the responsibility of the employee for the safety of others or to the extent of injury to others he can prevent. Accidents to the employee himself are rated under unavoidable hazards. The degrees range from "Little responsibility" to "Work where safety of others depends on correct action."

9. *Responsibility for Work of Others* indicates the responsibility of the employee for assisting and instructing other employees in the performance of the work. The first degree carries "No responsibility," whereas the fifth degree is "Responsible for instructing new employees and for maintaining the flow or progress of work within the group."

10. *Working Conditions.* The surroundings or physical conditions, over which the worker has no control, that cannot be eliminated or safeguarded, but which affect his mental or physical well-being are covered by this factor. Degrees range from "Clean working conditions," through "Work having some disagreeable elements that are not continuous," to "Work having at least one extremely disagreeable element."

11. *Unavoidable Hazards.* This factor relates to the hazards, both accident and health, that are connected with or surround a job, even though all safety measures have been installed. The first degree calls for "Work having little accident or health hazard"; the fifth, "Considerable degree of exposure to occupational disease or accidents resulting in death."

A committee composed of the foreman, one supervisor of the department in which the job in question was located, a representative of the collective bargaining unit, the production superintendent, and the industrial engineer analyzed each individual job by first describing the duties and then determining the amount of the job characteristics involved. Each element was the basis of discussion in this group until a point of common agreement was obtained.

Consistency of ratings between jobs and different departments was maintained by having the production superintendent and the industrial engineer take part in the analysis of all jobs.

The next step in job classification was the establishment of a base upon which the entire rate structure might be erected and the jobs evaluated. A simple coordinate chart was constructed with the vertical scale representing cents per hour and the horizontal scale representing job analysis points. The correlation curve was found by determining the starting point and the slope of the curve.

The starting point on the vertical scale was established by the collective bargaining contract. This point was on the 70-cents-per-hour base line. The point on the horizontal scale was determined by the job analysis points for the lowest rated job in the plant. This is the janitor's job at 130 points, which establishes the starting point of the correlation curve at 130 points and 70 cents per hour.

job grading

ELEMENTS OF JOB	1ST DEG.	2ND DEG.	3RD DEG.	4TH DEG.	5TH DEG.
SKILL (50)					
1 Education	14	28	42	56	70
2 Experience	22	44	66	88	110
3 Initiative and ingenuity	14	28	42	56	70
EFFORT (15)					
4 Physical demand	10	20	30	40	50
5 Mental or visual demand	5	10	15	20	25
RESPONSIBILITY (20)					
6 Equipment or process	5	10	15	20	25
7 Material or product	5	10	15	20	25
8 Safety of others	5	10	15	20	25
9 Work of others	5	10	15	20	25
JOB CONDITIONS (15)					
10 Working conditions	10	20	30	40	50
11 Unavoidable hazards	5	10	15	20	25

ALL JOBS ARE SCRUTINIZED IN THE LIGHT OF FACTORS SHOWN ABOVE

TYPICAL JOB CHOSEN

To determine the slope of the curve, the heavy truck tire builder's job was selected. This job represented more than 10 per cent of the production force. The average hourly earnings for this group were $1.68 per hour. The incentive for this job was 48 percent over the daywork base, which made the daywork hourly base $1.14 per hour. The analysis points for this job amounted to 380, therefore the point on the chart at $1.14 at 380 points placed the upper point. A line drawn through this point and the starting point determined the slope of the curve. The hourly base for

any job is found by referring on the horizontal scale to the job points assigned to the particular job, following this line up to the diagonal line or curve, and reading the cents per hour at that point.

Because this company believes that employees should be able to earn an addition to his hourly wage as a reward for putting forth his best effort, an incentive allowance was worked out. It was believed that the amount of this extra pay should vary according to the amount of physical and mental effort required to do a satisfactory job. In other words, a low degree of effort would require a low incentive in order to induce attendance, whereas a high degree of effort would require a high incentive to induce the employee to work harder than at a slow daywork pace.

In an attempt to determine the correct amount of incentive to be incorporated in piecework rates, a chart was constructed, based upon the physical and mental efforts sections of the job analysis plan. This chart shows the relative values of different combinations of degrees of physical effort and mental effort determined to be inherent in each job. The scale for mental effort was extended over the scale for physical effort in the belief that concentrated mental attention is more difficult to obtain than extra physical effort, therefore if requires more incentive to induce its use. The center line of the chart shows the relative weight of every possible combination of physical effort. The assignment values of 10 percent to 1-1 and 48 percent to 5-5 permit a scale reading wherever a combination line crosses the center line. These readings furnish the incentive percentages shown in the table that accompanies the chart.

FINDING THE PERCENTAGE

To determine the amount of incentive necessary to add to the hourly base for any job, reference is made to the degree of physical effort and the degree of mental effort assigned in the job rating. The combination of both elements applied to the table indicates the incentive percentage.

The average incentive earnings thus obtained for each job are considered the amount an average man should be able to earn by applying himself diligently to his job, working at a pace that can be maintained week after week without physical harm. Individuals with stamina and alertness above average are able to earn 15 percent above average incentive earnings. Production standards were set that make it possible for the average worker to maintain average incentive earnings with a minimum of fatigue.

UNION LIKES PLAN

The operation of the plan has been so successful that the union and officers and stewards form a first line of defense against any inroads on it or any attempts to misuse it. It has proved as useful a tool to them, in answering questions as to the fairness of the rate structure, as it has to management.

It is obvious that where several men are doing the same work, some will work more diligently and better than others. As job evaluation attempts to make wage rates fair between different occupational classifications within a plant, merit rating attempts to make earnings fair between different people working on the same jobs at an hourly rate.

Each employee is rated by his foreman and supervisors on the basis of (1) quality of work; (2) quantity of work; (3) adaptability; (4) job knowledge; (5) dependability; (6) attitude; (7) attendance. The consensus of the raters is entered on the grading form, and the grade points are entered and totaled. The grade represents a percentage of the established range for the job over the minimum. The minimum pay is the rate determined by job classification. The maximum rate is determined by adding 15 percent to the hourly base.

Merit ratings are made at 3-month intervals, and once a worker attains a rating above the minimum he is not subject to reduction, until two consecutive ratings indicate a lower merit rate.

HALF-YEARLY AVERAGES

A record of individual average hourly earnings is maintained in the industrial engineering department. The information is entered after each pay period. At the end of each half year an average is taken. Each page indicates the approved average incentive earning and the hourly base, and variation from average incentive earning computed on a percentage basis.

Since the installation of this plan there has been a definitely marked improvement in attitude and accomplishment throughout the departments to which it applies.

EVERY THREE MONTHS WORKERS ARE RATED BY FOREMEN ON THESE BASES

MERIT RATING GRADES

FACTORS	A	B	C	D	E
1. QUALITY OF WORK	0	5	10	15	25
2. QUANTITY OF WORK	0	4	8	12	20
3. ADAPTABILITY	0	1	3	6	10
4. JOB KNOWLEDGE	0	3	6	9	15
5. DEPENDABILITY	0	1	3	6	10
6. ATTITUDE	0	1	3	6	10
7. ATTENDANCE	0	1	3	6	10

Zero ratings in 3 of the 7 elements cancels any merit increase indicated by the remaining elements

NEMA SETS NEW STANDARDS FOR FRACTIONAL HORSEPOWER MOTORS

A broad new program of standardization for fractional-horsepower motors, designed to reduce production costs, insure efficiency and proper application, and result in long-term savings to users, has been announced by the Motor and Generator Section of the National Electrical Manufacturers Association.

The new standards provide specific definitions of motor rating and performance in coordinated terms of horsepower rating, speed, breakdown torque, and service factor. In formulating the new standards, the motor manufacturers felt that a clearly defined and generally accepted method of evaluating motor performance was essential to assure intelligent design, manufacture, and use of small power motors. The fundamental points covered in the standards include not only this new basis of rating, but also the previously standardized locked rotor or starting currents of motors.

This is only the first phase in the new program of standardization, and will be followed later this year by other items of standardization such as dimensions, and application standards for hermetically sealed motors, belt-drive refrigeration compressor motors, and those used in various other applications.

In formulating the standards, careful attention was also given to factors that will permit selection of proper control equipment and wiring. Effort was made likewise to define the standards in terms that will afford maximum freedom in design progress, and to establish values conforming closely to present terms, products, and practices.

A summary of the points covered in the new standards relating to rating, starting currents, and service factor, follows:

The values shown in Table I are the new standards for breakdown torque of single-phase fractional-horsepower motors.

The service factors given in Table II have been determined to define the loading that will give a total temperature rise of 50 deg. C. on a general-purpose fractional-horsepower motor having 40 deg. C. rise at the nameplate rating.

It will be noted that these service factors go up as far as 1.4, which means that the 40 deg. C. motor having a 1.4 factor may be operated at 140 percent load continuously.

STARTING CURRENT LIMITS

The maximum locked rotor current standard is not new, having been adopted by NEMA several years ago. The standard provides that the locked-rotor current of 60-cycle, single-phase motors (900-3600 r.p.m. range) of any type, except those split-phase motors at present used on washing and ironing machines, shall not exceed the values given in Table III.

The recent standardization extends the stamping of the National Electrical code letter on the nameplate of fractional-horsepower motors to 1/20-hp. rating. This code provides a marking from which can be determined the actual starting current and provides a check as to the motor's conformance with the standard for locked rotor current. Such information is of value to suppliers of control equipment and power suppliers.

TABLE I. Horsepower Rating in Terms of Breakdown Torque

Small-power single-phase induction motors shall be rated primarily on the basis of breakdown torque. The value of breakdown torque for the purpose of defining horsepower rating shall fall within the following ranges:

Revolutions per minute						
3600 3450	3000 2850	1800 1725	1500 1425	1200 1140	900 850	Synchronous R.P.M. Approx. Full-Load R.P.M.
Breakdown Torque Oz.-Ft.						Brake Hp. Rating
2.0-3.7	2.4-4.4	4.0-7.1	4.8-8.5	6.0-10.4	8.0-13.5	1/20
3.7-6.0	4.4-7.2	7.1-11.5	8.5-13.8	10.4-16.5	13.5-21.5	1/12
6.0-8.7	7.2-10.5	11.5-16.5	13.8-19.8	16.5-24.1	21.5-31.5	1/8
8.7-11.5	10.5-13.8	16.5-21.5	19.8-25.8	24.1-31.5	31.5-40.5	1/6
11.5-16.5	13.8-19.8	21.5-31.5	25.8-37.8	31.5-44.0	40.5-58.0	1/4
16.5-21.5	19.8-25.8	31.5-40.5	37.8-48.5	44.0-58.0	58.0-77.0	1/3
21.5-31.5	25.8-37.8	40.5-58.0	48.5-69.5	58.0-82.5	.....	1/2
31.5-44.0	37.8-53.0	58.0-82.5	69.5-99.0	.....	.....	3/4
44.0-58.0	53.0-69.5	.....	.....	.....	.....	1

Note: Breakdown torque range includes the higher figure down to, but not including, the lower figure.

TABLE II. Service Factors for General-Purpose 40-Deg. C. Induction Motors

Horsepower	Factor
1/20	1.4
1/12	1.4
1/8	1.4
1/6	1.35
1/4	1.35
1/3	1.35
1/2	1.25
3/4	1.25
1 at 3600 r.p.m. only	1.25

TABLE III. Starting Current Limits for 60-Cycle, Single-Phase Motors

Rated Horsepower	Locked Rotor Current, Amperes	
	115 Volts	230 Volts
1/6 and smaller	20	10
1/4	23	11.5
1/3	31	15.5
1/2	45	22.5
3/4	61	30.5

GOOD ORGANIZATION ASSURES SAFETY PLAN'S SUCCESS

DWIGHT DW DAVIS • SECRETARY, EXECUTIVE SAFETY COMMITTEE
ILLINOIS WATCH CASE COMPANY, ELGIN, ILL.

Safety programs that are properly organized won't bog down. It's organization, in Illinois Watch Case experience, that counts—counts enough to warrant plant operating men in other industries taking a look at one that is planned to assure:

1. Management control and full participation.
2. Regular inspections and follow-ups.
3. Employees who are alert to their own welfare responsibilities.
4. Protection suited to the plant's size and special needs.

Four groups made up of plant personnel handle safety problems in one of the following categories—administration, planning and rule-making, inspections, plant protection. The functional chart on the facing page shows how the safety organization is set up and how specific authority is delegated.

In setting up the program, a director was first appointed. Serving under him are an assistant and a stenographer. In addition to his duties as director of the program, he serves as chairman of an executive safety committee, which is a planning and rule-making group made up of seven permanent members representing all plant supervisors. The safety director and the safety committee operate directly under the works manager.

Two inspection teams, acting as eyes and ears for these groups and each consisting of three plant foremen, make weekly inspections in the plant, which is divided into two areas, A and B. These men serve for six weeks on a rotating schedule. One vacancy is created and filled every two weeks, so that all foremen eventually have a turn in the group. Human nature being what it is, foremen from one area always inspect areas other than their own. This practice has the added advantage of filtering good ideas and methods from one department to another.

VOLUNTEER FIRE SQUAD LEARNS ABOUT GAS MASKS FROM CITY FIRE CAPTAIN

On a specially prepared form, the members of each inspection team report full descriptions and precise locations of all unsafe conditions.

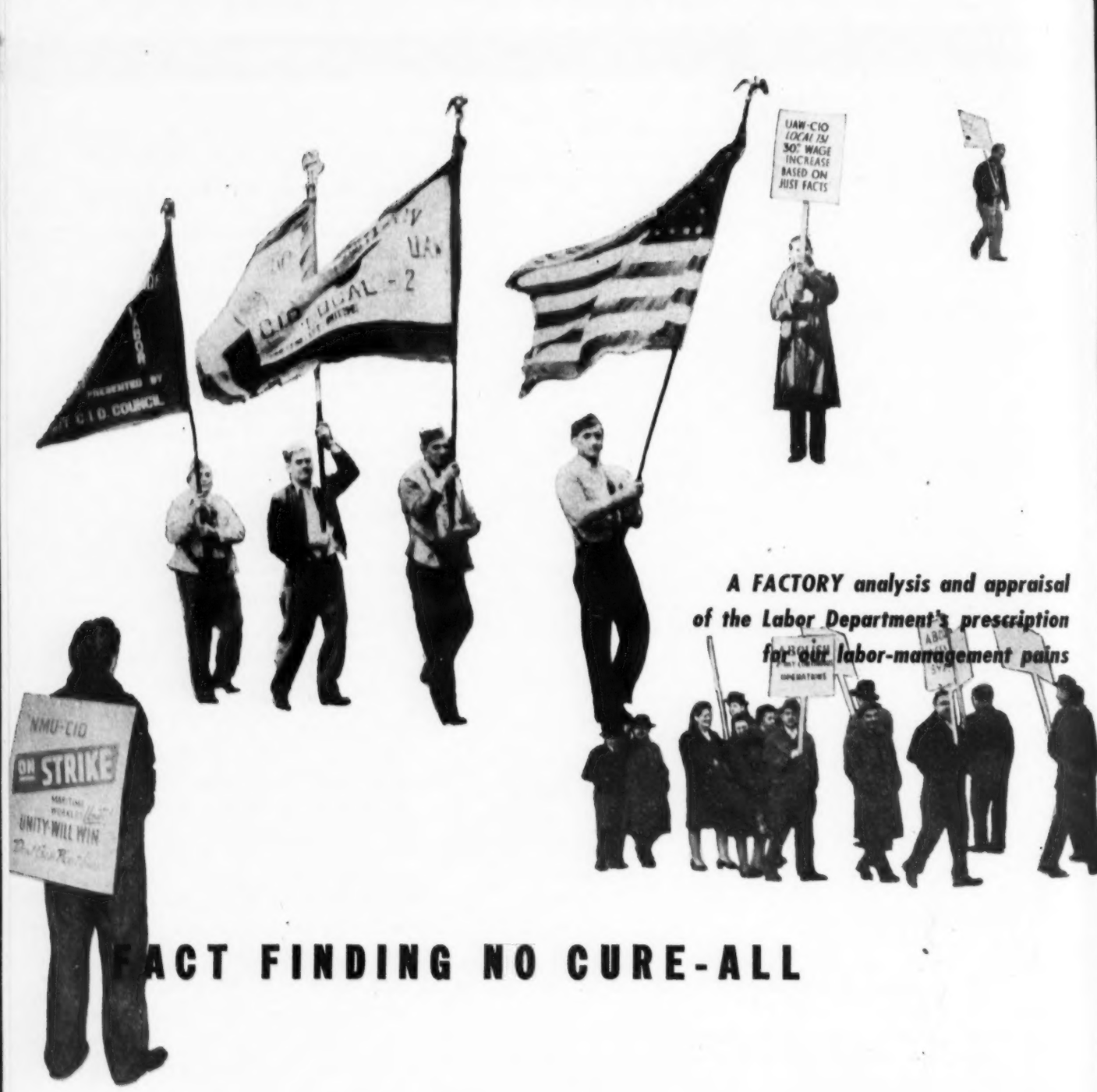
The chairmen of the inspection teams—always the oldest foreman on the committee from the standpoint of assignment—transmit these reports immediately upon completion of the inspection tour, to the safety director. The director and his assistant follow up each report to see that corrections are made promptly.

A volunteer firefighting squad also has been organized. The services of a captain from the city fire department have been enlisted for training fire squads in techniques of plant protection.

Here a violation of safety rules is discovered, and will be promptly reported, by a member of one of the inspection teams, who make weekly plant tours

What's What in Safety — AT ILLINOIS WATCH CASE COMPANY.

AUTHORITY	PERSONNEL	FUNCTIONS
Administrative Group	Director of safety program	1. Serves as chairman of executive safety commitee; calls and presides over meetings; presents legislative subjects 2. Keeps minutes of meetings; issues requisitions and orders 3. Schedules and administers directives of the committee 4. Makes bimonthly report to works manager 5. Studies and brings to committee's attention new developments in safety procedure 6. Prepares all forms for safety reporting and recording 7. Authorizes direct action in emergencies
	Assistant to the director of the safety program	1. Follows through on orders of the safety director 2. Serves as liaison between safety program administration and plant personnel 3. Serves on the volunteer fire squad
	Stenographer	1. Handles correspondence and records
Control Group	Executive safety committee comprised of the following seven permanent members: Director of safety program Superintendent of manufacturing Chief engineer Chief industrial engineer Plant architect Supervisor of stores and traffic Superintendent of plant maintenance	1. Maintains legislative supervision of safety problems relating to: (a) First aid and plant hospital services (b) Sanitation standards for the dispensing of food and beverages (c) Lockers, dressing rooms, washrooms (d) Protection of physical properties against water and fire risks and other hazards (e) Environment and welfare of employees 2. Requires an accounting from any department head who fails to correct unsafe practices
Inspection Group	Six plant foremen (plant is divided into area designated A and B; an inspection team of three plant foremen is assigned to each area)	1. Assist director of safety program in carrying out the directives of the executive safety committee 2. Make weekly inspections of respective A and B areas 3. Fill out standardized inspection forms 4. Make recommendations to the safety committee
Firefighting Group	Plant fire chief (appointed from the volunteer fire squad by the executive safety committee)	1. Directs training and activities of volunteer fire squads 2. Specializes in checking and caring for such fire equipment as hoses, ladders, various types of fire extinguishers, annunciator devices, automatic sprinkler systems, main water system, and regulation and control points
	Volunteer fire squads	1. Learn location of fire station boxes, main valves, shutoffs 2. Drill and practice with firefighting equipment
	Chief captain, city fire department	1. Gives 2-hour class once a month in practical phases of industrial firefighting technique. Fifty members of volunteer fire squads attend



A FACTORY analysis and appraisal of the Labor Department's prescription for our labor-management pains

FACT FINDING NO CURE-ALL

What will Washington's answer be when and if labor breaks out in a rash of strikes this winter?

You'll need only one guess—and you probably won't like it. *Washington's answer is going to be fact-finding boards.*

Don't shy away, however, says the Department of Labor. Based on the success it has had with ten boards appointed by the Secretary, the department believes the boards have been successful in providing a "reasonable basis for settlement." The boards' recommendations may not have been followed exactly. They may not have resulted in immediate settlements. But, says the department, they have aided collective bargaining.

The two Presidential boards, though, are another story. General Motors and the auto workers fought a long, hard battle after the board appointed by Mr. Truman had made its report. The President himself settled the steel strike by dictating 18½ cents, leaving his fact-finders with nothing to do but make a "terminal" report.

Because of the poor payoff on Presidential boards, Washington observers believe that Mr. Truman will not use them again when disputes reach the stage where his desk

is the one and only resort. He will probably rely on Dr. John R. Steelman's abilities and the capacity of the Steelman ear to absorb punishment from long-distance telephones.

The President, too, will undoubtedly appeal to the 80th Congress for labor legislation fitting his formula. The chances are good, though, that major industrial labor troubles will break before the Congress can act. Even if it should succeed in getting new labor laws on the calendar early, it is doubtful that they will fill the prescription laid down by the President at the time of the railroad strike last May.

So—fact-finding boards, as they have been developed by the Labor Department, will be the chief reliance when disputes rise above the altitude of ordinary conciliation.

SUPER-CONCILIATORS

Fact-finding boards, as the department advocates them today, are different in conception from the emergency instruments grabbed up last year when the War Labor Board expired.

They are seen by Edgar L. Warren, director of the Labor Department's Conciliation Service, as tools for super-conciliation. They bring to the problem men of a higher caliber than the usual conciliator. In addition, they focus public opinion on the dispute, but not necessarily on "the facts" of the dispute.

By "focusing public attention" on a dispute, if nothing else, the boards add to their own authority. With the last-minute appointment of the board, usually done only after the dispute has become critical, the publicity tends to give the boards the effectiveness of arbitrators.

Warren emphasized that both sides in the dispute must accept the fact-finding board voluntarily and that neither side is bound to accept the recommendations. In several cases it has happened, too, that one side or the other has indicated in advance that it would accept any "reasonable" recommendations, thus easing the job of the board.

The boards will be used only in two types of cases stated Warren:

1. Where a strike or possibility of a work stoppage creates an emergency in a community. The Milwaukee Gas Light board appointed August 7 and the Pacific Gas & Electric board appointed May 9 were both set up to handle this type of situation.

2. Where the dispute affects a major part of the economy—as in the Coos Bay jurisdictional squabble, the International Harvester Company strike, the meat packing case, and the oil industry dispute.

In its experiences with the ten fact-finding boards appointed by Secretary Schwellenbach, the Labor Department feels it has learned much to aid future fact finders.

It will not again use a tripartite board, as in the Greyhound Bus case. It does not want to risk having a squabble between the industry and labor members in the glare of publicity. In other words, why upset a board supposedly functioning as an instrument of the people with an internal dispute of the same type the board is attempting to settle? Industry and labor members, who may be more or less partisan, also add to the pressure on the public members.

The fact finders, too, will limit themselves to the key arguments. In the International Harvester case the board considered the entire labor-management contract. The Labor Department feels the job was simply too much for the board, that it merely widened the area of dispute, and that such widespread probing weakened collective bargaining. In the future, boards will limit their recommendations to the one or two key problems, probably wages or jurisdictional issues.

The Labor Department's policy of choosing members on the basis of competency and not "big names" will continue. The department feels that the ability of board members and their understanding of the problems has been one of the key factors in settling disputes.

Members of the boards feel they are performing a public service. Originally they were paid $100 a day for their services. Now fees are "varying." The Labor Department feels that most of the members do better for themselves financially at their own work.

Today most members are either from law or academic fields. The Labor Department probably would like to avoid members of the War Labor Boards to be sure that neither side is prejudiced against them from previous experience. But, on the other hand, the old WLB members have the most experience in the field, and they know such technicalities as the proper form in which to phrase their recommendations and report. Incidentally, of the 35 men who have served on the ten boards appointed by the Secretary of Labor and the two appointed by the President, only one has served on two boards and two have been members of three boards.

Considered from the Labor Department's viewpoint—that most of the disputes have been settled on about the terms recommended by the fact finders—the boards have been successful. In the Milwaukee Gas Light Company case, the company and the CIO Gas, Coke & Chemical Workers came to complete agreement before the board reported. In the non-ferrous metals

case, the companies and unions settled on the terms the board recommended after bargaining on such minor points as retroactivity.

But the settlement hasn't always come quickly and easily. The fact finders in the International Harvester case reported, recommending an 18-cent hourly increase, on Febr - ary 18. But it was April 10, at the end of a grueling 100 hours of negotiations in a little more than a

week, before the settlement came. Assistant Secretary of Labor John W. Gibson personally led the final mediation meetings right up to 4 o'clock in the morning of the day the decision was made.

How successful future boards will be will probably depend on how closely they can stick to the task outlined for them by Chief Conciliator Warren. That task is to aid collective bargaining.

The General Motors board floundered and other early boards found the going rough when it came to interpreting national wage policy.

The boards first had to consider the precedents of wartime wage control and of the War Labor Board. Then the President and Department of Commerce publicly advocated wage increases—as long as they didn't result in price increases. The wage-price line bulged with the steel settlement and broke completely on the coal settlement. Then the boards could only go along with the unions demanding wage increases, even when the unions disregarded prices or "ability to pay."

LACK POLICY

Fact finders are also handicapped in that there's little continuity between cases. The War Labor Board built its decisions on a structure of precedents. Each group of fact finders, however, goes in "cold," with very little in the way of policy to guide them.

The lack of continuity is a handicap especially in cases of principle. The War Labor Board was able to formulate its maintenance-of-membership policies and other basic principles under day-by-day experience. The fact finders in their very conception are limited when it comes to evaluating principles.

Fact-finding boards are certainly no answer to conflicts of principles such as the ability-to-pay issue. Involving not current production and costs, but the prospects for future profits, "ability to pay" is one of the rocks that may sink the entire fact-finding procedure. Boards that were supposed to dig up the "facts" on which public opinion might crystallize, actually did some long-range, highly optimistic guessing to bolster their wage recommendations. Time has already shown, particularly in the General Motors case, how badly such crystal-balling can miscarry.

the american way

Continued prosperity depends on there being a proper balance between a man's productivity and the amount of return he gets for an hour's work. The worker in a highly mechanized industry can produce enough wealth to enable him to get a high return for his labor. Workers in the lagging, non-mechanical industries cannot

ALBERT M. SARGENT, President, American Society of Tool Engineers, in the Detroit Times

The climax—as yet—in the ability-to-pay issue came August 30 in the report of the Western Union fact-finding board.

The War Labor Board granted the telegraph company's employees a 21 percent wage increase last year. The company promptly went into the red. On appeal, the Federal Communications Commission granted it a 10 percent boost in over-all rates for one year to bail it out. But even before the rate increase went into effect, employees were back for another increase. The fact finders, in some 6000 words of discussion on a general wage increase, decided that WU wages had not advanced as rapidly as wages in comparable industries. It recommended another approximately 20 percent increase.

The fact finders did not ignore the company's ability to pay entirely. It stated that technological improvements, internal economies, and the high level of business activity expected by observers might offset the increases. In addition, an FCC survey might end in further economies. Finally, the wage increase might lead the FCC to grant another rate increase—although FCC said in granting the last increase that it would not make another.

Even if rates are increased again, competition from telephone and air-mail services may cut heavily into the telegraph business, meaning fewer jobs in the long run. Those factors are outside of the fact-finders' scope, though, ruled the board.

The board summed up the issue:

"The factor of inability to pay, while not without weight, is of minor importance because the wage adjustment involved is designed to restore a reasonable balance between Western Union wage levels and levels in related industries."

In this way, boards will go on to set precedents for the national pattern of action in handling the next round of wage demands. Chances are, too, that they'll have no better guide on national wage policy or better clarification of the limits of collective bargaining than did the hard-pressed General Motors panel.

Fact-finding boards are no answer, either, in a struggle for power. With the Steelworkers, Mine Workers, seamen's unions, auto workers, or railroad workers determined to carry their demands beyond collective bargaining, conciliation, or arbitration to a show-down of economic force, any well-meaning set of citizens that steps voluntarily into the middle will just be trampled on in the battle.

Their appointment, in fact, may further weaken collective bargaining in such a case. Bargaining will be suspended until the fact finders are appointed. Rather than finding facts, however, the boards will be just a stepping stone in moving the issue right up to a nation-wide showdown.

WON'T STOP STRIKES

Fact finders are no answer to the Truman Administration's bankrupt labor policy, its helplessness in the face of determined union action. The President made no attempt to use them in the recent maritime strike or the Pittsburgh power strike, possibly because the strikes were too explosive for the delay that would be involved in fact finding.

Certainly fact finders won't end the parade of unions carrying disputes to the White House, where the only solution is to give unions at least part of what they want.

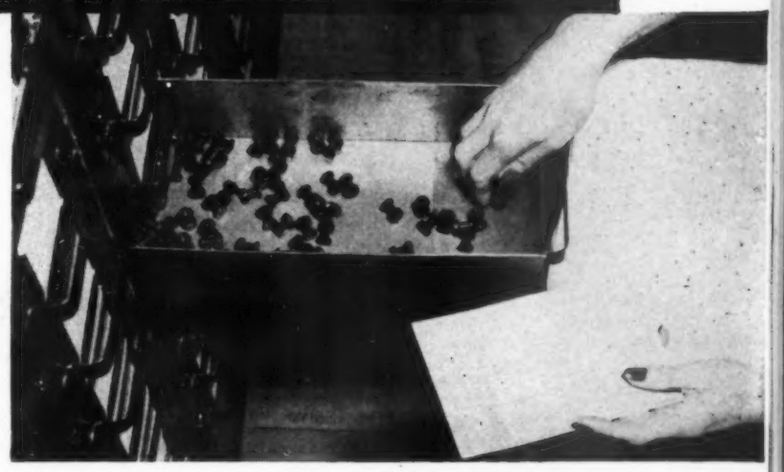
The boards will be used by the Labor Department, however. There is no alternative. Many of them will aid collective bargaining, if the unions bargain. But they are not—and the Department of Labor realizes it—the answer to all labor troubles.

STORAGE THAT MEANS NO WAITS FOR PARTS

RALPH J. WOOD • SUPERVISOR OF STOCK DIVISION, NATIONAL CASH REGISTER COMPANY, DAYTON

At assembly points, parts are stored in stock trays, which hold a week's supply. Trays are replenished from bins in departmental stockrooms

Parts common to many machines are stored in department that uses the greatest number. Front of bin is rounded for easy grasping of part



Parts for assembly operations are always at hand at National Cash. There is no need to write requisitions on the main stockroom in order to get them.

The parts are stored at assembly points in stock trays, which are made up of several tiers of hoppers, each with several compartments. The compartments carry a bin label, with name and page or blueprint number of the part. A minimum of one-week's supply is kept in each compartment.

In the assembly department stockroom, parts are stored in metal drawers in cabinets. The cabinets are known as "home" bins, or "right-away" bins.

The "home" bins contain all the stock received from the manufacturing departments that is common to many of the machines assembled throughout the plant, and are placed in the assembly room that uses most of that particular part.

"Right-away" bins contain a 2-week supply of stock drawn from "home" bins. They are kept filled by having a card pulled, with the part number, name, and quantity desired, and sent to the "home" bin stockroom, where the stock keeper fills the order and sends the stock and the card back to the originating stockroom.

The stock clerk checks the compartments at assembly points every day. A notation on a pad shows the number of the bin that holds the needed part, either in the "right-away" bins or the "home" bins. The list is taken to the stockroom where the parts required are obtained and delivered to assembly.

STOCK IS CHECKED

While removing parts from the "right-away" or "home" bins, the clerk visually checks the stock in the bin with the amount shown on the card. If the number of parts left is near the ordering limit the card is placed in a file on the stockroom desk. When the card has been taken from a "home" bin, it is sent to the stock-ordering department for a new manufacturing order. If the card comes from the "right-away" bins, it goes to the stockroom where the "home" bin is located, and is returned to the "right-away" bin with the stock drawn.

When all parts listed have been obtained, the clerk places them in the proper compartments.

FORK TRUCKS FOR HEAVY HANDLING

H. W. KNOX • PLANT SUPERINTENDENT, AMERICAN LAUNDRY MACHINERY COMPANY
CINCINNATI

Fork trucks are saving between 75 and 80 percent of the man-hours it used to take to unload and store sheet steel at American Laundry Machinery Company. Other important savings are 40 to 50 percent in moving heavy laundry machinery from the production to the inspection and shipping departments, and more than 80 percent in moving punch press parts from the press department on the ground floor to the machining department on the second floor. And in addition, accidents that resulted from carelessness or overloading when transportation was done manually have been almost entirely eliminated.

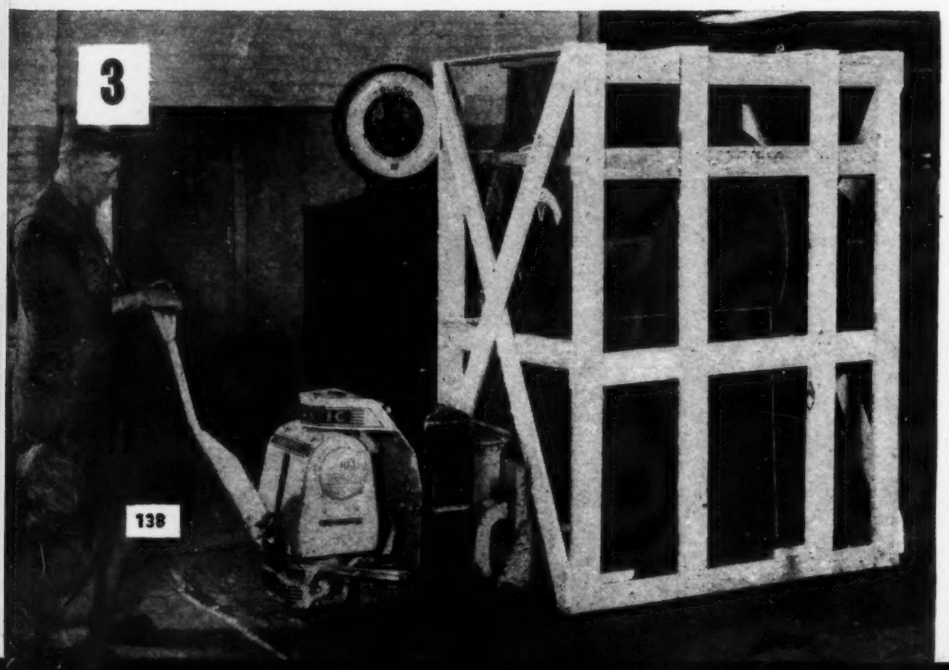
1 Receiving yard for truck shipments is narrow. All steel plate for raw stock must be stored in yard. Increased business required expanded inventory. No more space could be had. It became necessary to store different grades and classes of steel in the same piles. Two heavy-duty lift trucks eliminated manual handling, made this kind of piling practical. By old hand method, a 7000-lb. truckload of steel plates took 16 man-hours to unload and pile. With lift trucks, sometimes singly, often in parallel, this same job now takes an average of only 3 man-hours. A typical example of how this method works out in actual practice is illustrated in the photograph—which shows how two fork trucks, acting in concert, pick up a load of steel plates, preparatory to moving them to storage.

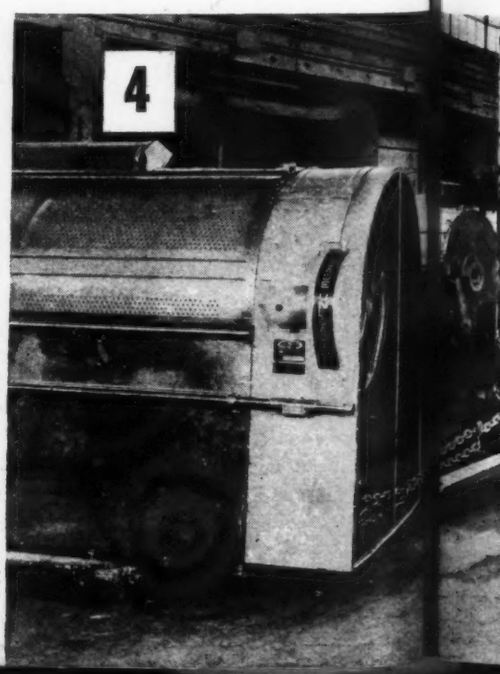
2 To move heavy punchings to the machine shop, it used to be necessary to pick them up, place them on a hand-pulled floor truck, and move them to the shop. An 80 percent saving is effected by piling them directly on a skid, and moving the skid by means of a small electric hand truck.

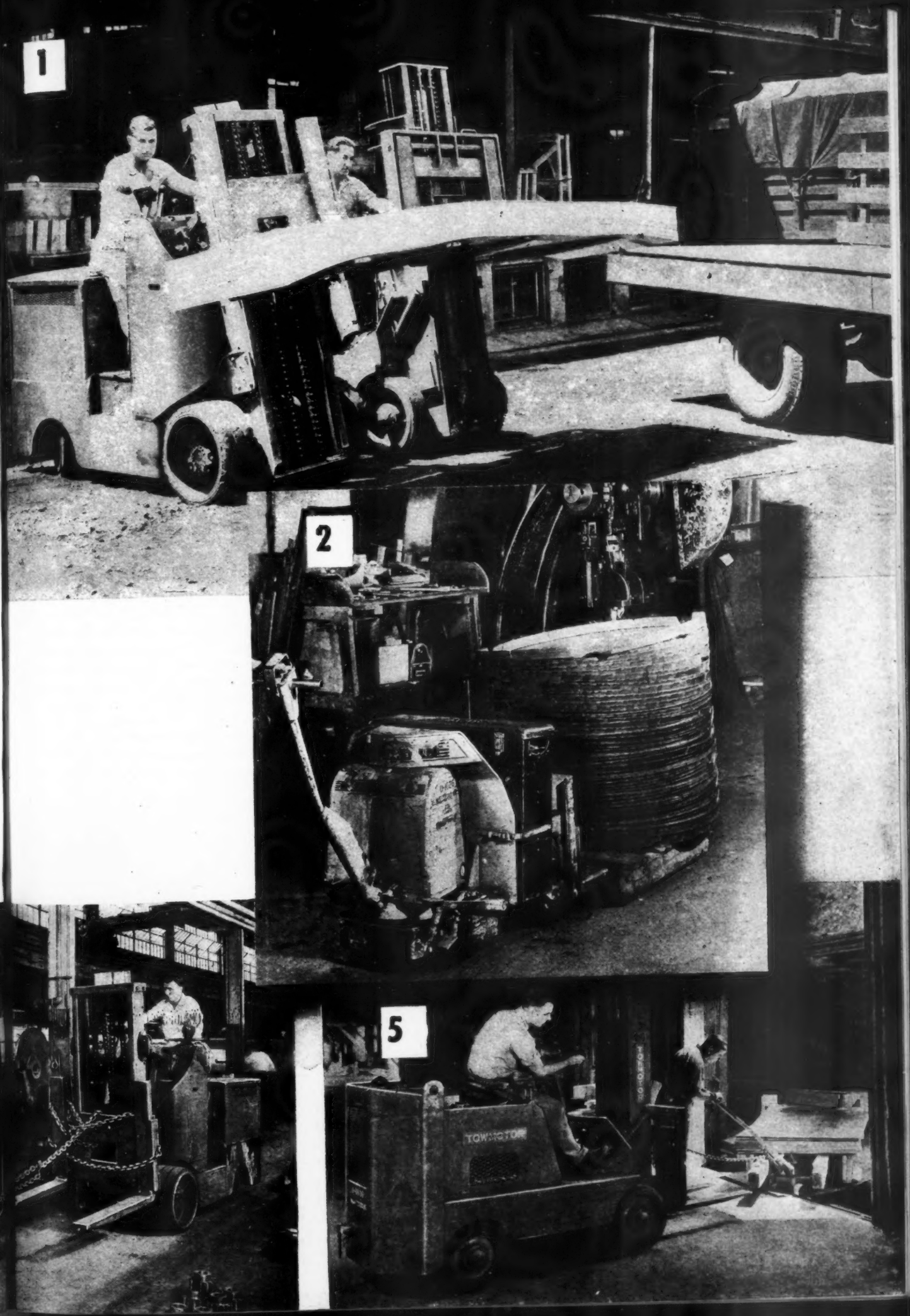
3 Lighter-weight assemblies of machinery are constructed directly on a skid, and it is possible for one man and a small electric hand truck to make the move from production to inspection in 10 minutes. Compared with hand moving of one of the smaller tumbling machines (36x30 inches, 850 pounds), this shows a saving of 75 percent.

4 Large dump washers (7000 to 16,000 pounds) were moved by jacking them up onto dollies and pushing them to inspection. Depending on weight, this took six to eight men 1 to 1½ hours. By chaining machine to a heavy-duty truck, it is done by three or four men in 40 to 60 minutes; average saving of 66 percent.

5 Boxcar unloading has been simplified, too. A lift truck cannot enter the car, but placing a load of 6000 to 8000 pounds on a hand lift truck and pulling it to the heavy-duty truck for tiering has cut unloading time by 60 percent. It used to take four men a full day to unload an 80,000-lb. boxcar; job is now done by two lift trucks (hand and heavy-duty) and three men in just about half the time.



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CAFETERIA A BIG FACTOR IN LOWERING COSTS

MARSHALL P. FOX • GENERAL MANAGER, CONTAINER CORPORATION OF AMERICA CLEVELAND

Justification for good in-plant feeding facilities is found on the profit-and-loss statement. Decreasing cost of manufacture reflects the improved morale and efficiency of better-fed workers.

Final appraisal of the cafeteria at the Container Corporation's Cleveland plant runs something like that. Recently installed for the use of its 325 employees, the cafeteria is an essential part of a long-range, company-wide industrial relations program.

The full list of benefits attributed to the cafeteria cuts across almost every activity in the plant. Here are the more important results:

1. Better plant housekeeping.
2. Fewer accidents.
3. Less absenteeism.
4. Lower labor turnover.
5. Improved supervisory-worker relationships.
6. Higher morale, greater loyalty.
7. Healthier workers.
8. Better grade of applicants.

Prior to the installation of the cafeteria, employees had the choice of patronizing a lunch catering service that came to the plant, or crowding into a small nearby restaurant, or bringing their own lunch.

To accommodate workers who lunched in the plant, the company had provided a lunchroom, about 10x12 feet in area, in the middle of the manufacturing floor. It was enclosed in plywood partitions, and contained plain wood tables and benches. Clothes lockers lined the lunchroom walls.

Many employees preferred to eat lunch near their workplaces, and a few of them improvised electric hot plates. Each such spot was a fire hazard. Furthermore, sanitation was a major problem. Rats and vermin were attracted. Empty bottles on floors, in corners, and in waste cans became an accident hazard and added to the housekeeping problem. These conditions reflected in less efficient production. Employees munched all during the day, and illnesses and headaches resulted from overindulgence as well as from eating the wrong kinds of food.

With the new cafeteria in operation, the rule that forbids eating in working areas is being enforced without difficulty, and the sanitation problem has disappeared.

REST PERIOD RELAXATION

During the morning and afternoon rest periods, for which time is paid, many workers relax in the cafeteria. The half-hour lunch period is staggered in four groups, beginning at 11 a. m., to permit use of the cafeteria by all workers without overcrowding, and to spread the work load of its personnel more evenly over the entire day.

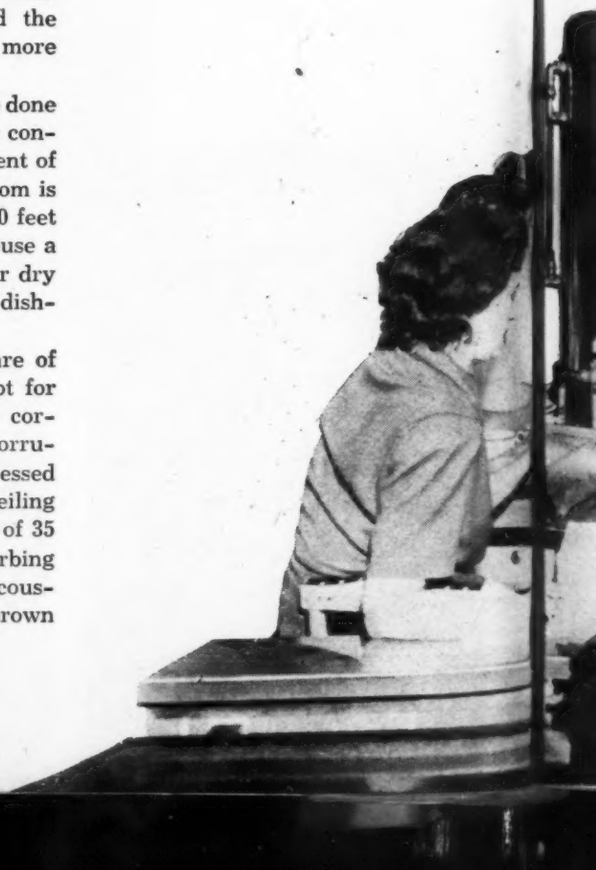
Cafeteria appointments have done much to create an atmosphere conducive to the greatest enjoyment of these facilities. The dining room is rectangular, 25 feet wide by 40 feet long. Four adjacent rooms house a modern kitchen and spaces for dry storage, vegetable storage, and dish-washing equipment.

Walls in the dining room are of light-brown glazed tile, except for a section along the entrance corridor, which is of translucent corrugated structural glass. Recessed troffer lighting in the 11-ft. ceiling was designed for an intensity of 35 foot-candles, without disturbing glare. Ceiling is treated with acoustic tile. Other features are brown marbleized asphalt-tile flooring, venetian blinds, and built-in window boxes along the outside wall.

Furniture is maple-finished. Tables have linen-finish plastic tops, and stainless steel center-pedestal bases. At one end of the room are several rattan lounge chairs, and a radio-phonograph and albums of records for music at mealtimes.

BUILT FOR CLEANLINESS

Cleanliness is not limited to front-window dressing, but also rules in the "back of the house." All service rooms have glazed tile walls that are easy to keep clean. Floors are of the non-slip abrasive type. Good fluorescent lighting bans dark corners. Work tables and sinks are stainless steel. Plenty of shelf space keeps food off the floor, and bulk foods, such as potatoes, are stored in large galvanized-steel cans. A 700-lb.



deep-freeze unit supplements the large 6-door kitchen refrigerator.

During a typical month the cafeteria serves 16,800 meals—an average of 560 servings a day. To accomplish this, a cafeteria organization of ten people is required.

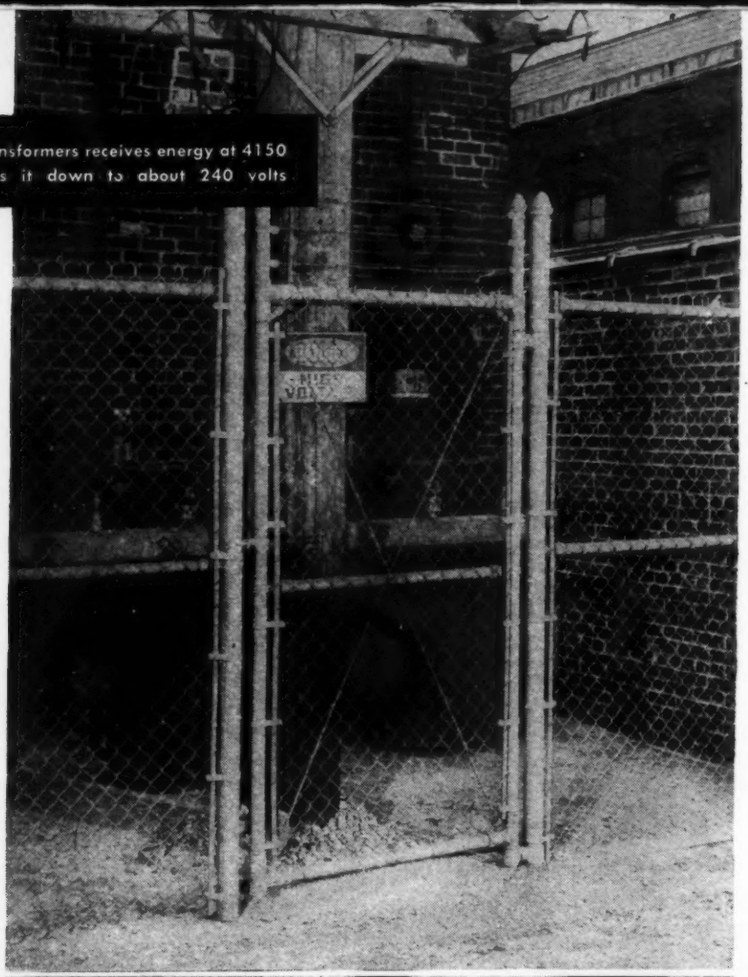
According to the records of the plant dispensary, the health of employees has improved noticeably since the cafeteria's advent. At least half the workers include a green salad in their meal every day, and more than three-quarters drink half a pint of milk. Cases of headaches and dyspepsia have dropped considerably. Employees suffer less from colds. Underweight workers, who have been checked monthly, have gained in weight, and those requiring special diets are better able to maintain satisfactory health.

A "FAMILY" ATMOSPHERE

One of the outstanding results of centralizing all eating in the cafeteria has been the growth of the "family" relationship among all employees. There are no reserved tables for executives, and an atmosphere of friendliness and better understanding among management, supervisors, and workers has been created. In addition, workers are displaying an increased sense of loyalty and greater interest in company welfare.

Cleanliness and eye-appeal characterize food served in Container Corporation's cafeteria—which is a far cry from the locker-lined space in the center of the production floor, furnished with wooden benches and tables, which was formerly used for the workers' lunchroom

Trays are loaded with nutritious and well-prepared food when workers leave the cafeteria line; employees are healthier and happier, lose much less time because of colds and illness



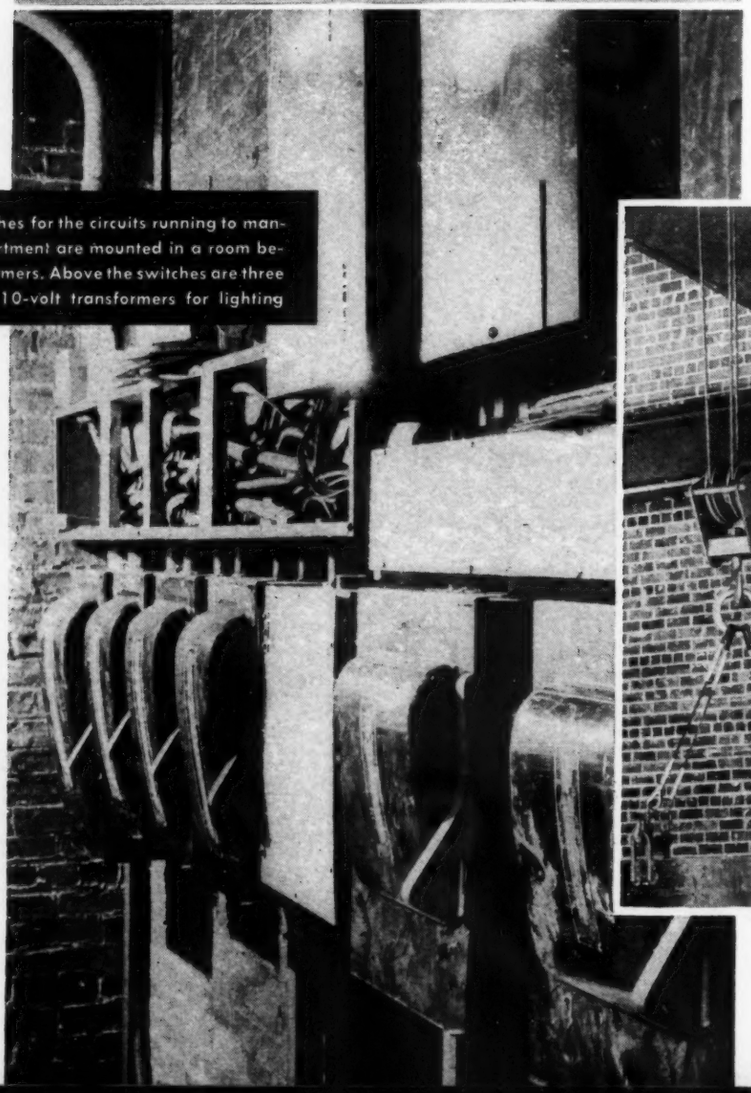
This bank of transformers receives energy at 4150 volts and steps it down to about 240 volts

Every possible precaution against sparks or flashes had to be taken in selecting and installing the electrical equipment in United Chromium's Organic Coatings Division plant at Carteret, N. J. Therefore, all the electrical equipment in the manufacturing, solvent stores, and finished product stores areas is of the explosion-proof type, vapor-proof in the case of lighting fixtures. Even the floors are conductive and spark-proof. Hammers, wrenches, and other tools used in the manufacturing department are of spark-proof beryllium copper instead of steel.

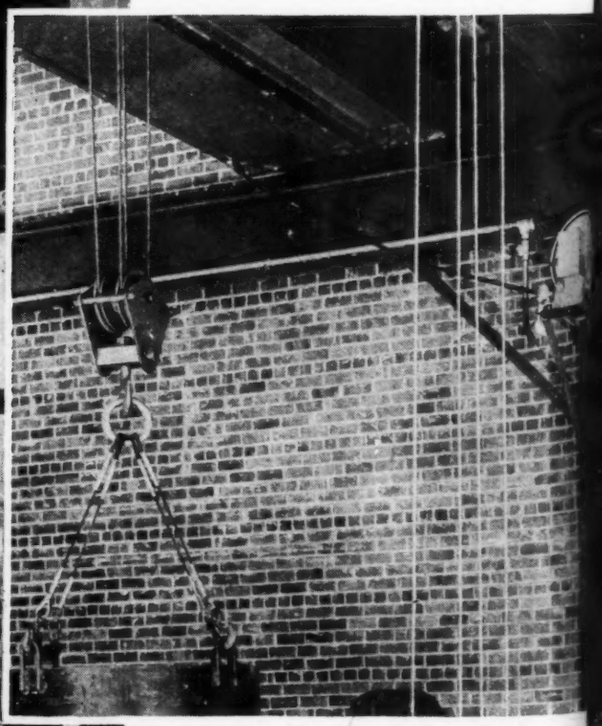
FLAMMABLE MATERIALS

These precautions were adopted because the ingredients of the lacquers and synthetic enamels manufactured, particularly the solvents, are highly volatile and flammable materials.

Electrical energy is delivered to the plant at 4150 volts, three-phase, 60 cycles. It is stepped down to approximately 240 volts by a bank of single-phase transformers mounted



Disconnect switches for the circuits running to manufacturing department are mounted in a room behind the transformers. Above the switches are three 10-kva., 220/110-volt transformers for lighting



Three-ton overhead crane gets its power through a cable that is paid out by a reel

CORRECT ELECTRICAL EQUIPMENT MINIMIZED EXPLOSIVE HAZARDS

F. G. BAUER • MECHANICAL ENGINEER, UNITED CHROMIUM, INC., NEW YORK

outside the building. The manufacturing department, where the hazards are most serious, is located at the opposite end of the building. The intervening space is used for dry raw material and finished product storage and is considered to be less hazardous. A brick firewall of approved thickness separates manufacturing and storage areas.

Instead of laying out a conventional electrical distribution system to supply the manufacturing department, it was decided to run separate circuits from the low-voltage bus directly to the individual motor-driven mills, mixers, dissolvers, and pumps. This arrangement was adopted to minimize and localize as much as possible any faults that might develop.

The fused safety disconnect switches for these circuits are mounted in a room directly behind the transformers. Above these switches there are three single-phase, 10-kva. 220/110-volt transformers which supply current for the lighting system.

From the switchroom the circuits are run in conduit to a bank of explosion-proof starters that control the motors or groups in the manufacturing department. Similarly, separate circuits are run in conduit to explosion-proof starters controlling the solvent pumps.

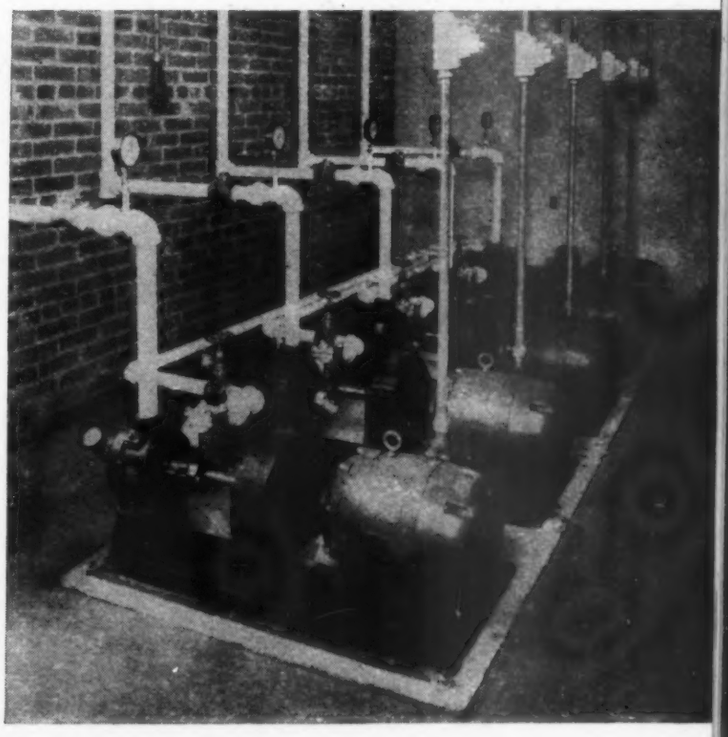
The solvent pumps are located in a small brick building adjoining the manufacturing department, but separated from it by a firewall. Starters for the solvent pump motors are mounted in a small room formed at one side of this structure by a firewall that separates them from the pump room.

All starters are the full-voltage type with fuses and thermal overload protection.

Some 30 motors are required to drive the equipment operated by the

Starters for the 2-hp. pump motors are located in a small room which is separated from the pumproom by a firewall

The solvent pumps are driven by 2-hp. explosion-proof motors, controlled by the pushbuttons seen here and in another view



manufacturing department. These motors are all of the explosion-proof type and range from 1 to 20 horsepower in size. All are controlled through conveniently located pushbuttons. For greater safety or convenience a number of motors can be started and stopped from two or more points. For example, the pump motors can be controlled from the isolated pump-room and also from the header where the solvent pipes terminate in the manufacturing department.

The 3-ton overhead traveling crane in the manufacturing department is equipped with three explosion-proof motors rated 10, 5, and 1½ horsepower, respectively. To avoid possible sparking, crane motors are supplied through cables that are paid out and retrieved by reels, rather than by exposed sliding contacts.

Provision has been made for automatically shutting off all power circuits (lighting circuits are not affected) should a fire break out. This action is brought about by a pressure switch which also controls the carbon dioxide automatic fire protection system. The switch is operated by actuating bulbs suspended from the roof framing which respond to any sudden rise in temperature. Operation of the pressure switch, in addition to setting off the extinguishers, automatically closes all firedoors, as well as the windows in the solvent and finished product storage areas.

All equipment and supporting structures are grounded. There are several grounding systems, one for each group of equipment. Each system comprises a 5-ft. strip of copper 3 inches wide and ¼ inch thick, buried in permanently moist earth. To them are brazed suitable lengths of ¼x1-in. bare copper strips which are brought up and securely bolted to the equipment to be grounded.

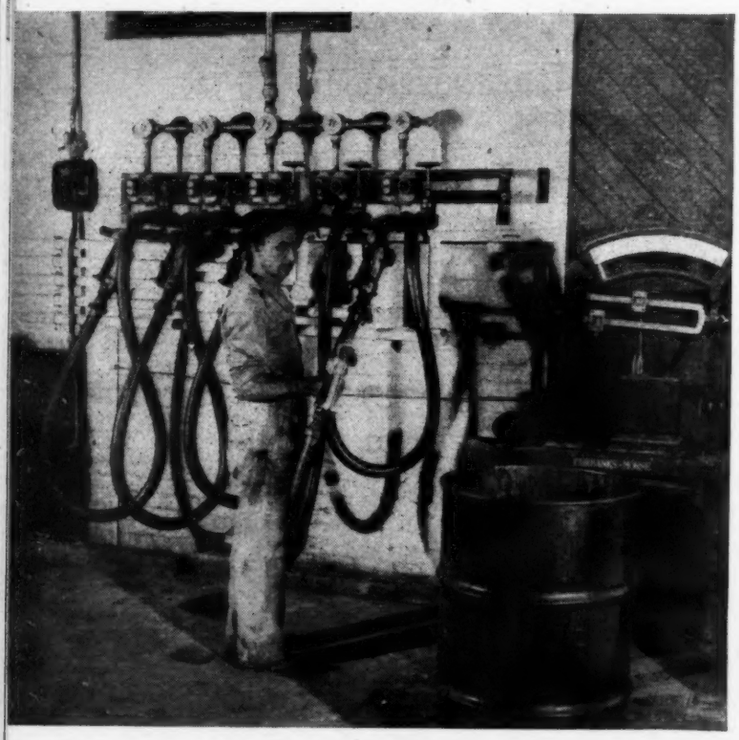
Grounding conductors fitted with strong spring clips are provided at all dissolving and mixing machines, and wherever else solvents are transferred from one container to another. Workmen are required to see that all containers are properly grounded before a solvent is poured from or into them. The purpose is to drain off any static that might be formed.

Safety has played a most important part in the construction of this plant. It was felt that the cost of spark-proof conductive floors, explosion-proof equipment, and an automatically controlled fire protection system, would be inexpensive insurance against possible injury to personnel and loss of man-hours, with interruption of production.

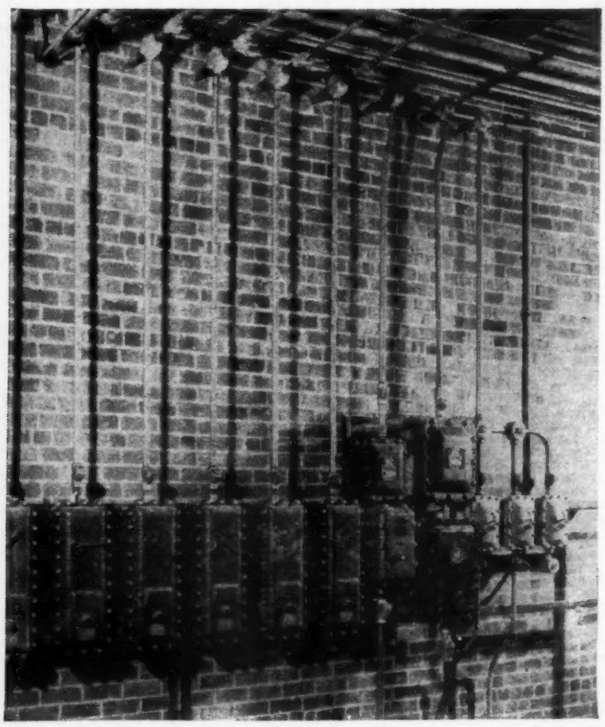
Every Month . . .

AMONG THE ADVERTISING PAGES, these valuable aids to low-cost productions: the plant operation man's guide to **WHAT'S NEW IN EQUIPMENT** (page 172) . . . a summary of **LABOR DEVELOPMENTS** (page 236) . . . things **YOU WANT TO KNOW** more about (page 228)

Pump motors can be started and stopped also from the point where solvents are delivered. A colored light in the housing beside each pushbutton shows when the corresponding motor is running



Explosion-proof starters for all motors except those that drive pumps and roll mill are grouped on one wall of manufacturing department. Pushbuttons are conveniently located near machines



A multiple management board in action—the best of the plant's "know-how" is brought to bear on a suggestion. Boards have shown that a wealth of production ideas can be found among interested employees

multiple management

a tool to stimulate productivity

FACTORY MANAGEMENT AND MAINTENANCE • Plant Operation Library No. 98 • October, 1946

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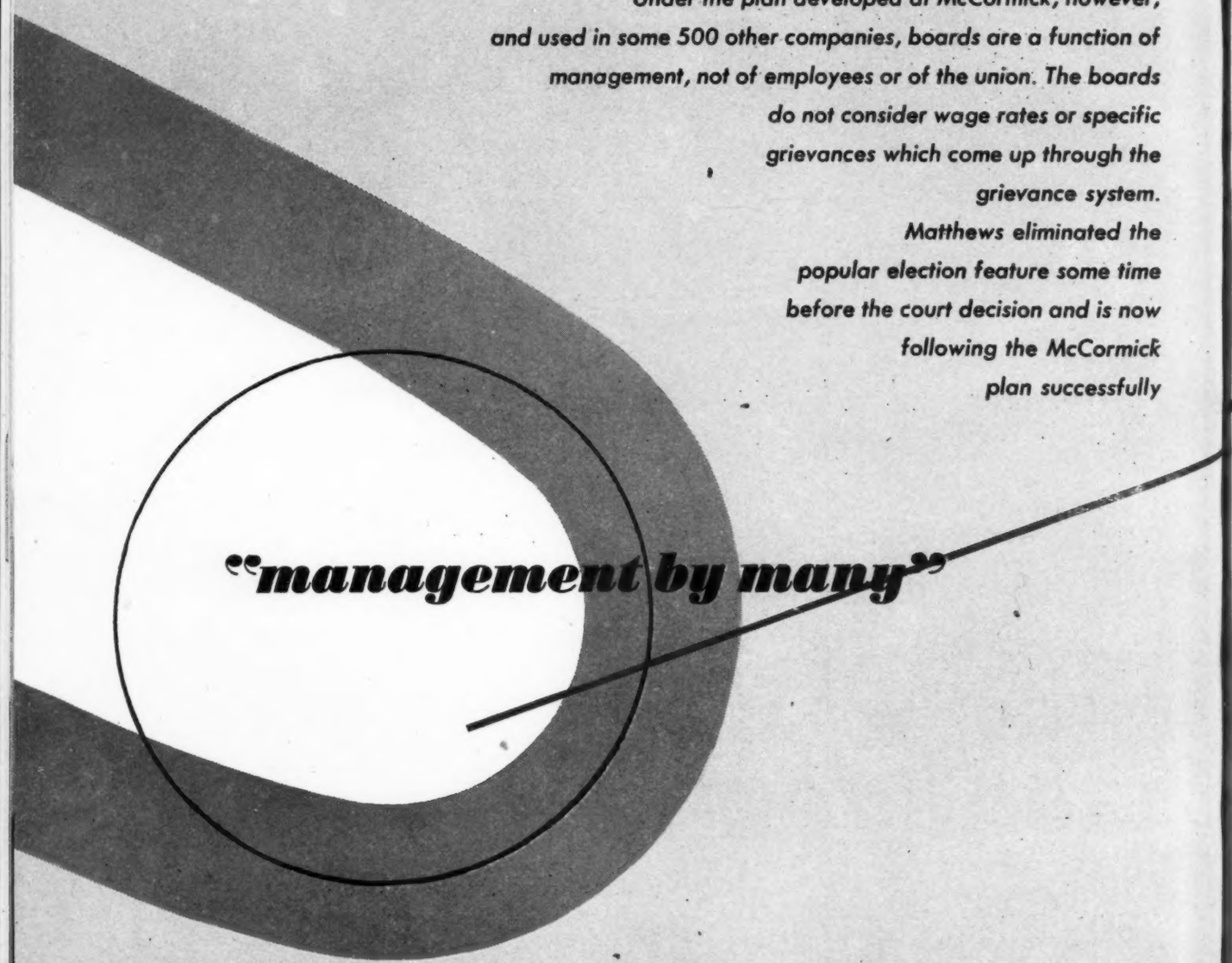
despite reports to the contrary, multiple management plans do not violate the Wagner Act, and all such plans are not in jeopardy as a result of the recent decision against the James H. Matthews & Company plan in the United States Third Circuit Court of Appeals.

wagner act **not** violated

The plans are not affected by the decision except in the Matthews case. Matthews is the only company known to have used a variation of the plan in which junior board members were elected by vote of all employees. Unaer the court decision, that did make it an employee organization dominated by the company.

Under the plan developed at McCormick, however, and used in some 500 other companies, boards are a function of management, not of employees or of the union. The boards do not consider wage rates or specific grievances which come up through the grievance system.

Matthews eliminated the popular election feature some time before the court decision and is now following the McCormick plan successfully



FOREMAN GIVES COMBINED MULTIPLE MANAGEMENT BOARDS A SUGGESTION REPORT

how "management by many" operates

Multiple management—a successful answer to the human relations problem in industry—is getting management's attention today as a tool to stimulate productivity.

Presidents and vice-presidents, in industries where international unions and national wage patterns are eliminating wages as a competitive factor, are looking into multiple management as an answer to their problems.

Tested in more than 500 companies, the plan's basic premise is that "the more creative and thinking people who can be efficiently brought into active management participation, the greater will be the knowledge and interest in company affairs of its employees."

Literally "management by many," the plan is built around groups of young men, potential managerial material. Experience in its successful use in 500 companies reveals two principal advantages. It encourages "management thinking" among junior executives and becomes an excellent training school for future top executives. It becomes a gold mine for new ideas, paying off directly in dollars.

A third benefit, not originally anticipated but which has developed in the plants working on the plan, is a new cooperation between management and workers. Because the junior executives in both office and factory are close to workers and because they thoroughly understand their management's thinking, the junior executives become two-way transmission belts for ideas. They carry employee attitudes to the top, with sound recommendations for handling problems, and they spread management's ideas widely through the plant.

Success of the plans, of course, hinges on sympathetic top management. Boards have produced spectacular results *when* encouraged by top management, *when* they had free access to company books, problems, and operations, and *when* they had operating independence. In cases where top management has insisted that a representative of senior management sit on board meetings, initiative has been stifled;

the boards have been limited to innocuous generalities.

The company is protected, though, against radical action. Most plans specify that junior board recommendations must be made unanimously and that all recommendations must be approved by the senior board of directors or by the department head concerned. The boards can only recommend. They cannot act on their own.

The original plan, and the model for the 500 companies now using multiple management plans, is that of McCormick & Company in Baltimore. When Charles P. McCormick took over the presidency in 1932, he decided the business was too big for one-man rule. Because the company was in the red, the senior board of directors was willing to try almost any plan offering relief.

IDEAS WELCOMED

His plan for setting up a *junior board* might be followed by any company seeking better employee relations today. He called in 17 young men in executive and administrative jobs, and explained the idea. Company books and operations would be open to them. He would welcome any ideas they might generate. There would be only two limitations—all recommendations must be unanimous; all must be approved before being put into effect.

The board elected a chairman and secretary. It set its own operating rules, following, in general, parliamentary procedure. It began to meet weekly and soon turned up with ideas for sales, for packaging, and for operation that brought the company out of the red, guaranteed employees 48 weeks of employment each year, and raised employee relations to a new level of cooperation.

Multiple management plans are so flexible that they may be adapted to almost any company's conditions. Many companies, for instance, have developed *sales boards*, made up of salesmen below the level of senior management who show promising ability. Such boards may meet only twice a year, as McCormick's sales board does, and still be effective.

Once set up, the boards should be self-perpetuating. Senior management usually appoints board members initially, then the boards themselves elect future members. At McCormick, for instance, each board member, in semi-annual elections, rates each of the other members on a merit rating plan designed solely to measure executive ability. The six members with highest ratings stay on the board, become a nominating committee to elect new members. To insure rotation of membership, some boards have ruled that no one member may serve consecutively for more than four terms or two years. That is merely an added precaution at McCormick, because the semi-annual elections have provided adequate rotation.

Merit rating is a key to successful operation. Senior management must constantly impress on board members that elections are based on executive potentialties, not popularity, and not as a reward for long service or a job well done. Merit rating insures a membership of "creative and thinking" persons. It takes popularity and politics out of the board plan as much as it is humanly possible to do so.

In conceiving the plan, McCormick stressed the need for thinking men. He pointed out that only one person in ten has any interest in management or is capable of real thinking—and he wanted that one in ten on the board.

There is no other requirement for membership in most plans —except that members of senior management are not eligible.

Profit-sharing plans have developed with multiple management plans in most cases—although they are not a requisite. They have come about, usually, because junior boards have successfully demonstrated to top management the benefits of tying in employee interests with management's interests.

A second widespread development of junior boards is the sponsorship of executive training plans. Board membership in itself is executive training. Department heads, as members of the boards, become acquainted with over-all company problems, learn to coordinate their work with that of other departments, and are able to step up in the organization without major difficulty in breaking in.

Junior boards, however, go beyond this. At McCormick, soon after the junior board was organized, it set up a sponsorship plan which has been a widely adopted feature. The board selects promising youngsters, offering them a 3-month sponsorship period. It is really a get-acquainted period in which the youngster works with three board members, one for each month of his sponsorship. He meets his current sponsor once or twice a week for luncheon or an informal talk. He gets the answers to his questions about the company; he is guided in his development within the company; and he is appraised as a possible future board member.

When returning veterans became a problem, sponsorship plans were quickly adapted to them. Today board members in many companies each have a veteran or two whom they help to reorient.

TEAMWORK

Junior boards, in factory, office, or sales organizations, usually work as teams, too. Most plans provide for weekly meetings. Once a month the boards may have an evening meeting, frequently a dinner meeting at company expense, at which all unfinished business is cleaned up.

Then either weekly or monthly, they team up with other boards in the company in a combined meeting with top management or with members of the senior board of directors. Boards in many companies sponsor meetings for all employees, often under chairmanship of a member of the factory board, at which top management and board members bring all employees up to date on employee plans, production and sales problems.

To stimulate board members and add to prestige of the boards, multiple management plans usually award members directors' fees and frequently give them a larger share of profit-sharing bonuses, sometimes doubling the amount they

Junior board of directors at Mohawk Carpet Mills, Inc., Amsterdam, N. Y., sits for its portrait. With more than 4500 employees, it is one of the largest plants using multiple management

would ordinarily receive as employees or giving them extra credits in figuring their dividends.

Size of the boards may run from 7 to 15 members. Sponsors feel they should be as large as possible to cover as many potential executives as possible and still be small enough to make group discussions practicable.

Experience with the plan shows that the rare failures have come from two causes. Either top management set the plan up and then failed to follow through in encouraging development, or it stifled initiative by failing to give boards independence of operation.

In successful use, multiple management has replaced fear with faith in employee relations, has stimulated ideas, has developed second and third teams of executives, and has produced sound labor relations.

It has given the small and medium-sized companies that have pioneered with the plan the edge in human relations, the extra initiative and interest of employees, to offset the high-priced specialists and high-priced technology of giant industries.

multiple management and the supervisor

More important in labor relations and in production problems than the junior board is the *factory executives board.* In setting up the boards, however, the junior boards should come first, to be sure top management is sold on the plan and will give its backing to the younger executives.

Designed primarily to bolster the foreman's position, factory boards give him a closer contact with management, better knowledge of his department and its functioning with other departments, and a chance to get solid help on his problems from other foremen and executives.

C. P. McCormick, Jr., saw the need for factory boards when he served as an enlisted man in the Navy in World War I. There he saw Navy chief petty officers set up in a little world of their own, directing enlisted men but subordinate to officers. Winning their rank and uniform through progressive step advancement, chiefs have better pay, better uniforms, better quarters, and far more authority than the men under them. At the same time, as graduates of the ranks, they know their men and their work. Called the backbone of the Navy, they probably could run it successfully on their own.

To give foremen Navy incentive, the training and knowledge, and something comparable to the prestige and authority—on a voluntary basis—McCormick conceived and instituted the factory board plan.

Factory board results have been even more spectacular than junior board results in many companies. They have:

1. *Streamlined production*

through suggestions. At Lance, Inc., a commercial bakery in Charlotte, N. C., the factory board revolutionized hand production methods into automatic mass production, largely through the use of equipment designed and built right in the plant. New methods have so increased production and cut costs that the company cannot measure the results of individual suggestions developed by the board.

2. *Developed prestige of supervisors.* Board decisions are obeyed as front office rules never were.

3. *Brought human relations to a new level.* McCormick, for instance, has abandoned time clocks, seen absenteeism and labor turnover go to lows unmatched in surrounding plants—and stay there even during the war.

By taking fear out of industrial relations and giving supervisors and workers recognition for work well done, the factory boards have done a real job in human relations.

The new cooperation fostered by the boards is probably best demonstrated at McCormick. Hard-and-fast factory rules are rare. Girls—more than 450 of them operate machines and pack spices and drugs—swap jobs every hour or so to avoid monotony. There are no rules about it. They arrange among themselves to make the change. To keep employment steady, they may even transfer from department to department in meeting production needs. The linotype operator in the print shop, when there's no type to set, may sweep floors.

Wage problems on these almost casual transfers are avoided by paying a machine operator the operator's rate even if she's hand-packing insecticides for a few weeks. The plant has no piece rates.

EMPLOYEE MEETINGS

The factory board runs, and the board chairman presides at, monthly meetings of employees. If there's a question of hours or operations affecting everyone, it is put up to employees. Recently, for instance, they voted on vacations. During the war, the plant operated 52 weeks to maintain top production, and employees chose vacation periods, with preference by seniority. This year, when it is possible to shut down completely for two weeks, the board decided it should not set policy.

It put the question to a vote. Employees elected to shut down the plant. Oldtimers, asked why later, said they thought everyone should have a chance to relax in the two most popular weeks.

That this faith in humanity has paid off is shown in production records. When the board cut 9 percent off the work day for morning and afternoon rest periods, production increased 12 percent. Similarly, last fall, when production was running ahead of demand temporarily, the senior board decided to give everyone a long Christmas holiday. Everyone would have two weeks, from December 21 to January 2, to enjoy the holidays with returning servicemen. The plan was announced early in December. In the next 3 weeks, McCormick people turned out 5 weeks' production, filling warehouses, surprising everyone.

Above all else, the factory board sees that everyone in the plant has a fair deal. If an employee is discharged, he may appeal to the board. It's a common boast through the plant that "it's harder to get fired than it is to get hired."

If the first shift hears an outstanding speaker at noon, the second shift gets the same program one way or another. Every group and every department get the same treatment.

The board, in its 12 years of operation, has put through almost every imaginable idea to improve working conditions.

Results—better spirit, better cooperation, better production.

any company can use it

thirteen years under test in companies ranging up to 5000 employees and distributed from Seattle to Sydney, Australia, proves that big organizations as well as small can develop the multiple benefits of multiple management.

The pattern of the plan is unimportant. The philosophy counts. Any plan that broadens the management base, giving more thinking employees experience in management problems, and which emphasizes the faith psychology so important in multiple management, will give employees greater interest and incentive.

The Bridgeport Brass Company, Bridgeport, Conn., for instance, now has plans under consideration for setting up a junior board. The company has had, for several years, however, a president's cabinet, made up of eighteen officers and heads of executive departments, which meets twice a month and discusses every phase of the business.

Similarly, the company has a senate, made up of about 60 second- and third-line executives, which meets at least once a month. Too big for group discussion, the senate group hears minutes of the cabinet's meetings and hears a member of the cabinet speak. Senate members may ask any question they want about company operations and they get straight answers. Foremen, too, are well informed on company problems and policies through their active foremen's club.

Bridgeport Brass recently formed an eight-man top-management group functioning as a senior board for the plant. The company, too, won nation-wide praise for its labor-management committees during the war. Through the years, the company has brought increasingly large numbers of people into various labor-management activities

through the suggestion system, company outings, and other employer-employee contacts.

Another notably successful multiple management plan is in operation at Lance, Inc., a Charlotte, N. C., food products plant. It works through four boards.

The junior board does not have final authority. It investigates, listens to suggestions, and makes recommendations. From its ranks come the members of the senior board. There are seven of them.

The plant board is composed of men and women who either are foremen, supervisors, or employees without title. They have suggestions. They also receive the suggestions of the thousands-and-more others in their ranks.

The junior board's studies are specific—office personnel, office efficiency, new products, advertising, sales campaigns, packaging and packing, surveys, public relations, and executive training. The plant board studies production, schedules, new machinery, motion studies, shipping problems, warehouse policies, stock handling, order filling, safety and first-aid, and training.

The sales strategy board is made up of men in the sales department. It was set up for the purpose of developing better merchandising and increased sales. It studies all advertising features and suggests improvements in public relations machinery.

The senior board is the executive agency, the supreme court for all suggestions.

The results? Since 1943 multiple management has brought before the senior board 510 suggestions that had 100 percent approval of the groups presenting them. The senior board approved all but six.

Ten projects originated by the junior board are outstanding:

1. The Lance cafeteria serves more than 1400 meals daily to Lance employees. It has become an investment in good will, good health, and lots of happiness.
2. First aid—a greatly enlarged facility. It employs an all-time registered nurse and two assistants.
3. Establishment of an enlarged unloading space in the plant.
4. Installation of conveyors that mean time-saving, efficiency in handling products, and the elimination of much elevator work.
5. Landscaping adjacent to the plant.
6. Introduction of educational courses as well as courses in public speaking.
7. Uniform and organized system of plant inspection, with the employment of a full-time, trained food inspector.
8. Increased production.
9. Better working conditions.
10. A comprehensive public address system with more than 50 loudspeakers and a program of "music while you work."

How a group of younger executives set up and *unofficially* operated a multiple managment plan is shown in the case of Friez Instrument Division of Bendix Aviation Corporation, Baltimore. A group of junior executives studied multiple management plans and then organized an informal junior board of directors which met for a number of months. Having satisfied themselves that the plan would work, the younger executives presented a list of recommendations and findings to top management, which accepted the idea with enthusiasm. The plan today is an official part of Friez operations.

Only one board is necessary in smaller companies. The Progressive Welder Company of Detroit formally set up a junior board and put multiple management into effect with both shop and office personnel serving on the board. With only a few hundred, at present, working in the plant, the plan works well.

Any type of organization, too, may use multiple management. David Jones, Ltd., Sydney, Australia, largest department store of the "down under" continent, has a multiple management plan. Learning of the plan, Jones executives took

What Multiple Management Means at McCormick

Here are some of the things McCormick & Company has accomplished under multiple management. Although it originated the plan, the company is not as glowing in its praise of the idea as are others where multiple management has revolutionized methods.

***For the company*—a four-time increase in production and in sales with only small changes in equipment; labor relations that management is proud of; hospitality and courtesy admired throughout its field.**

***For employees*—total wages and bonuses approximately three times those of 1932, year-round employment. A pension plan and profit-sharing trust to insure them against disability and to provide a comfortable income on retirement. A profit-sharing plan that has provided bonuses equal to as much as seven weeks' salary in good years. Rest periods twice in each shift. Dental and medical care. Above all—a good place to work, where it is harder to get fired than to be hired.**

***For stockholders*—a dividend every year; 1945's total dividends were approximately 50 percent greater than 1932's.**

***For customers*—better products, better service, at an average of 20 percent less cost.**

Originator of multiple management and guiding hand in one of the most successful applications is Charles P. McCormick, president, McCormick & Company, Baltimore. Here he talks with a visitor

a "correspondence course" in its operation and set up a junior board in 1942.

Because even the biggest companies are divided into comparatively small department, division, section, factory, line, sales, or distribution units, the multiple management system can be applied anywhere—as long as there are enough boards to cover the creative and thinking employees.

One of the largest companies now using multiple management is Mohawk Carpet Mills, Inc., Amsterdam, N. Y. With about 4500 workers, principally skilled machine operators and carpet weavers, it is one of the largest businesses of its kind. Multiple management was inaugurated there in 1939 with a junior board and a factory board, which have been operating ever since.

That multiple management does not interfere with union activities is shown, too, at Mohawk. There employees are represented by the Textile Workers Union-CIO. Similarly, unions are functioning at The Williamson Heater Company, Cincinnati, and Eric Johnston's electrical companies in Spokane.

Multiple management is successful under two conditions:

1. Top management must be sold, willing to put faith in the human equation, willing to guide and encourage younger executives, willing to give the boards complete freedom of operation.

2. The plan gives thinking employees a voice in operation, makes available to them company books, problems and operational data.

Most successful of the multiple management plans have done a third thing: Linked profit-sharing and bonus plans acceptable to employees to the company's "ability to pay," giving all employees strong incentive to work for the company's greatest welfare and so increase their own earnings.

Two restrictions on the board insure the company against radical proposals: All board recommendations must be unanimous, all must be approved by the senior board of directors or the department head concerned.

Here are the questions most often asked about multiple management—and their answers:

Q. How many should serve on multiple management boards?

a. Numbers vary with size and type of the business. A 100-employee plant might have only one 7-man board. With 1000 employees, it might have junior executive, factory executive, and junior salesman boards, each with 10 to 15 members.

Q. How should board members be selected?

a. Top management should know its thinking, creative people, who should be named to the board in starting the plan.

Q. Should they all be put on boards?

a. Board membership might include one-half of them originally, with the others eligible at election time. Rotation will cover them all later, and competition stimulates interest in the boards.

Q. What are the qualifications for membership?

a. Most plans limit membership to "thinking and creative" employees who are not members of senior management. Anyone from a truck driver to department head may sit on the board.

Q. How does the rotation plan work?

a. In semi-annual elections, members rate themselves on "merit," drop lowest members, open the way for new men.

Q. Where do you find future talent?

a. Many boards have sponsorship plans for new employees. Training courses or employee organizations also will uncover talent.

Q. How do senior executives feel when juniors take command?

a. Junior boards can't take command. Boards only make recommendations to senior boards or department heads.

Q. How do the boards operate?

a. Boards usually follow parliamentary procedure in meetings. They may use standing committees to investigate problems and follow through recommendations. They often have permanent committees on safety, production, or housekeeping.

Q. Will they upset the organization, interfere in labor relations?

a. Multiple management plans supplement regular lines of authority. They do not interfere with management's established procedures or with labor relations practices.

Crane committee members inspect mechanical operation, cables, and electrical parts. Needed corrections are reported to the maintenance department at once

FIVE SAFETY COMMITTEES STIMULATE BETTER MAINTENANCE

J. PENBERTHY • PLANT MAINTENANCE SUPERINTENDENT, R. HOE & COMPANY, INC. NEW YORK

Good maintenance becomes better maintenance at R. Hoe & Company because it is dovetailed into a practical safety plan. Five special inspection committees see to it that the maintenance department gets five good stiff shots in the arm every month. That's 60 shots a year—all aimed at helping the department do a better job.

The primary concern of the inspection committees is safety. In practice the slant is strong for both maintenance and safety. Each of these five inspecting squads is composed of a chairman and three assistants. A supervisory group, to be described later, chooses committee members for their skill and experience. It is not only a mark of recognition to be elected to a committee, but a member has to keep himself fresh in this work in order to remain on an inspecting team. There is no definite time limit; he serves as long as his work is good.

Once a month the three assistants report to their committee chairman (each committee conducts its tour through the plant on a different day) and the foursome goes through all buildings and inspects in every nook and corner. This is how maintenance comes in for extra attention. Each of the five committees has four pairs of eyes looking in all directions and recognizing the things that must be looked for. Naturally the teams uncover items that any one man might overlook. In fact, committees are so thorough that they commonly turn up matters outside their province.

If equipment needs repair, or if a safety hazard is discovered, the condition is reported both to the foreman and to the plant maintenance engineer at once. In addition, a written safety report is forwarded with equal promptness to the safety director.

The names of the committees and some of their functions follow:

Fire prevention, building, stairs, and housekeeping committee. The

Regular maintenance, such as this monthly inspection of a generator, is backed up by safety inspections. Better maintenance is the result

J. Sorley, safety director (center), notes that grinders are doing their part for safety by wearing safety glasses. Departments have been educated to 100 percent use of goggles

chairman of this group is the safety director himself. Members are among the best mechanics in the plant. They have a strong natural leaning toward neatness; they go for clean work areas and clean tools. Typical of recommendations in their reports are such items as: "Properly wire electric splice boxes, repair windows, clean up sidewalk on street adjacent to building No. 10, and remove scrap pipe." In each instance specific locations are included.

Transportation, loading, unloading, and materials handling committee. This inspection team checks loading platforms, transportation trucks, and similar equipment. On a recent inspection tour the inspectors reported:

"Employees in department 77 are loading solid cast-iron ends with the chips. This creates a hazard while dumping the scrap in the truck at the yard."

In another department overloading was cited. In both instances the department foremen cooperated in having the conditions corrected immediately.

Ladders, cranes, slings, and elevators committee. Cables, all mechanical moving parts, slings, and ladders are gone over thoroughly. Members of this inspection squad ordinarily work with this equipment. They know the practical side of making a $5 repair before a $50 breakdown can take place, or correcting some item at fault before a lost-time injury results to themselves or a fellow-workman.

On their most recent tour the committee spotted a broken ladder. It was red tagged at once. The department foreman called the maintenance department and repairs were made before anyone was allowed to use the ladder. An unserviceable sling turned up in the next department. The committee members cut it up then and there.

Small hand tools committee. This group's assignment is that of inspecting all air guns, air drills, portable lights, extensions, air hoses, and similar equipment. Through several departments this committee reported such things as a sledge

SAFETY REPORT

FIRE PREVENTION, BUILDING, STAIRS, AND HOUSEKEEPING COMMITTEE

Below is a report of the Committee Tour of Inspection which was held June 19, 1946

1 — Repair windows — South Side — Building #11 — Dept. 80
2 — Properly wire electric splice boxes Eastend — Bldg. #11 — Dept. 80
3 — Replace missing life preservers at dock. One at forge and one near 138th Street
4 — Replace glass in door window of elevator — Dept. 31
5 — Build suitable racks for grinding wheels at cylindrical grinder 4242 — Dept. 77
6 — Clean up sidewalk on 137th Street longside Bldg. #10. Also remove scrap pipe
7 — Provide iron ladder for crane in Bldg. 9
8 — Repair dust collectors on roof of Bldg. 10
9 — Clean roof and drain pipe of Bldg. 9
10 — Remove steel racks from aisle near stairway to Dept. 72 westend of Dept. 75
11 — Fire hose at west end of Dept. 74 to be racked up
12 — Counterweight on fire door between Bldgs. 8 and 9 to be put in a pipe well — Dept. 72
13 — Resurface hand rail on stairway — Dept. 31

Committee:
J. Sorley, Chairman
Mr. Beerkircher
Mr. Schmidt
Mr. Brouillard

Respectfully submitted,
J. Sorley
J. Sorley

The relation between good maintenance and a low accident frequency rate is stressed in the reports used by the safety groups in dovetailing their work with improved machine operation, good housekeeping, and safe working conditions. The report shown above is typical

hammer loose on its handle, twisted lathe chuck wrenches, other tools unfit for use. Although primarily concerned with physical property, no group hesitates to deal with unsafe practices they may discover on the part of employees.

Machine tool operation, guards, and belts committee. In its latest monthly inspection tour, this team not only recommended safety washers for all hand grinders in two departments and called for various machine repairs, but it also was instrumental in improving housekeeping conditions. The thoroughness of the committees is repeatedly demonstrated in their ability to spot needs outside their regular fields.

The safety committees are directed by an over-all supervisory group including the plant general manager, the superintendents of the press and saw divisions, the production and the plant maintenance superintendents, and the safety director.

This interlocking directorate presides over monthly meetings attended by all safety committee members. At this time, safety reports, which chairmen have already forwarded to the safety director, are brought up for discussion. However, the first order of business is a report on the clearance of recommendations made in the previous meeting. Accident reports, compensation, and other safety subjects are scheduled for discussion; then the meeting is thrown open for comment on important problems.

Outside speakers, from the insurance company or other safety groups, are called in for the meetings. Sound motion pictures on handling operations, fire protection, and other subjects are shown.

Once every three months the regular monthly meeting is lengthened to give even greater attention to the safety program. At this time shop stewards attend.

In summarizing advantages of the combined maintenance-safety arrangement the following accomplishments must be listed:

1. Committees correct incipient troubles that individual inspectors might miss in the daily routine.

2. The groups work as a team and develop special know-how in working together.

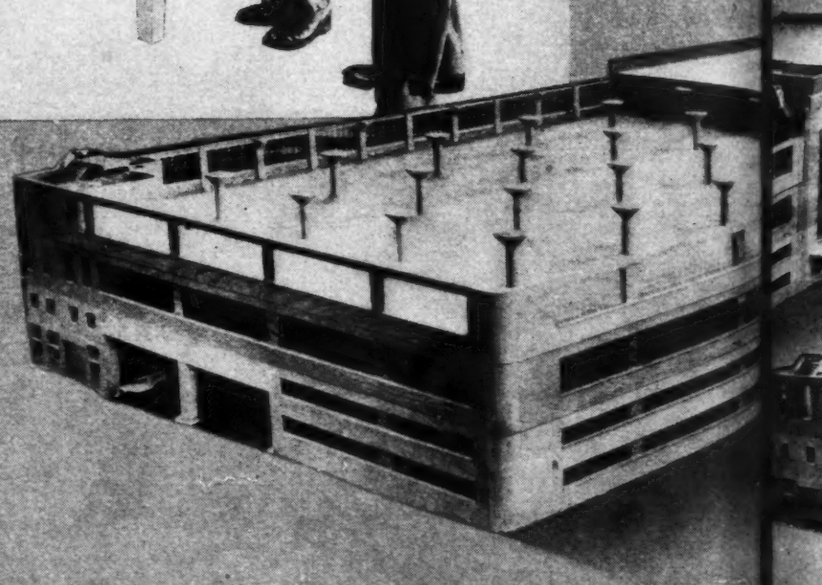
3. Departments learn to know the committees and cooperate with them both for safety and for improved maintenance.

4. Safety committee records provide valuable data required for insurance and city inspection reports.

5. Committees transmit good ideas throughout the plant. For example members of the inspecting teams (they are eligible for awards under the plant's suggestion plan system) have carried improved loading methods from one department into others. All the committees have practiced salesmanship of safety habits and are credited with educating departments to 100 percent use of goggles. As a result eye accidents have been greatly reduced. In one department, the example is cited of a workman's being sold so hard that he wore his goggles out of the plant and at home.

Plant engineer and production superintendent use scale model to plan new radio plant

1. Scale model complete



2. Roof removed from south ha

NEW PLANT LAID OUT FASTER AND SURER WITH MODEL

JOSEPH H. GILLIES • VICE-PRESIDENT IN CHARGE OF RADIO PRODUCTION, PHILCO CORPORATION, PHILADELPHIA

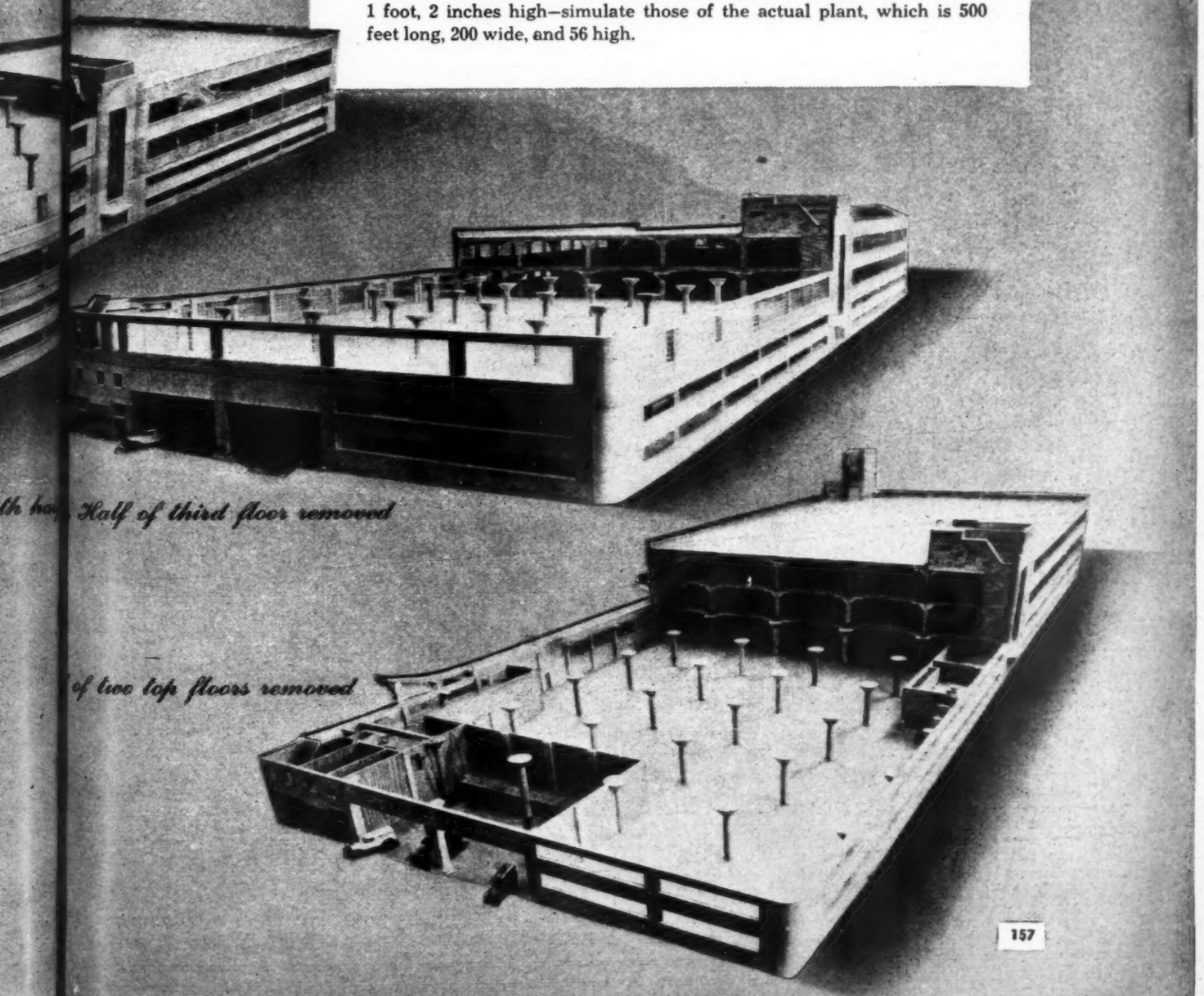
A wooden model of the new Philco radio manufacturing plant is now helping company engineers to study production possibilities of the floor space and to lay out conveyors, test apparatus, riveting machines, and other plant facilities in the most effective plan for mass production.

Built accurately to scale by the maintenance department's model shop, the miniature wooden factory reproduces every feature of the $2,235,000 plant which is just now going into production and will possess what Philco believes to be the longest continuous manufacturing lines for radios, radio-phonographs, and television receivers in the world.

The model is built in sections, so that each floor can be removed in halves, and details of the layout of each section of the plant can be decided separately. Even washrooms are reproduced in detail.

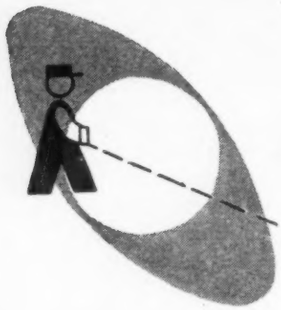
While the cost of this model was negligible, its usefulness in effecting the best possible arrangement of factory space has been tremendous. Particularly for production superintendents, the opportunity to work with a scale model instead of just blueprints has made it possible to decide exactly what equipment was needed for straight-line manufacturing, and where that equipment should be placed. As a result Philco looks forward to having the most efficient plant in the industry.

The scale to which the model was constructed is ¼ inch to 1 foot, so that its dimensions—10 feet, 5 inches long; 4 feet, 2 inches wide; and 1 foot, 2 inches high—simulate those of the actual plant, which is 500 feet long, 200 wide, and 56 high.



Half of third floor removed

of two top floors removed



Looking Ahead in Labor

last-minute round-up as we go to press . . .

Any union, or group of unions, powerful enough to bring the country to its knees can get what it wants from government, if not from employer. One has to look back at the steel, coal, railroad, and shipping strikes. Even the railway labor and wage stabilization laws weren't obstacles in the last two.

This condition has spurred union efforts to control whole industries. In shipping, CIO unions formed a committee for unified action; the AFL set up a maritime department. Now rubber and automobile workers want to bargain industry-wide. Others will follow suit.

War-induced habit of settling disputes at the White House must be broken eventually. *President will soon lose power of seizure.* Means are being sought for deciding labor-management issues at some point short of the White House.

•

Labor Secretary Schwellenbach feels fact-finding boards were successful, hopes to use more. Industries wanting a permanent panel to arbitrate disputes voluntarily submitted can have one in Labor Department if unions go along. Such a panel already is functioning for local cartage firms.

At the same time, the Administration is trying to decentralize disputes settlements, keep them out of Washington if possible. Regional labor-management advisory committees now work with directors of U. S. Conciliation Service. First job was to approve panels of impartial arbitrators. Other problems will be tackled as they develop.

Management is leaning toward acceptance of compulsory arbitration when necessary to avoid or settle strikes "affecting public interest." These would include disputes not only in public utilities, but also in coal mining, transportation, and, perhaps, basic steel. All suffered crippling strikes this year.

Some observers see new disputes-settling machinery as only way to keep strikes off President's doorstep.

Trouble now is that the White House is the sole terminal point. The Labor Department can only conciliate. Congress is sure to take up the issue next year. *It might pass something less than another Case Bill. And the President might sign it.*

Some Congressmen want compulsory arbitration of disputes where the public welfare is involved.

What legislation is passed will depend on many factors. Complexion of next Congress is one. This will be related to strength of CIO's PAC at polls next month. *Most important, perhaps, will be the strike situation at the time legislation is being considered. Congressional temperatures always rise quickly when strikes are raging. They drop just as fast when strikes subside. Another steel strike next February could cast the die.*

What to do about union monopolies—control over whole industries by one union, one labor leader—is on the minds of many Congressmen. **Anti-trust laws operate against industrialists, but not against labor unions.** Same complaint is raised more and more often against Wagner Act. Correcting law's partiality toward unions is sure to receive Congressional attention.

Fear of strike-control legislation is already evidenced in union reluctance to renew no-strike clauses in agreements. Such clauses could prove costly, when strikes occur, if any new law imposed penalties for violation of contract.

Communist issue in CIO is heading for a showdown at next month's convention. Murray has been a peacemaker between left and right wings. His resignation would split CIO wide open, drive some unions back to AFL. A factional fight for control could wreck it.

•

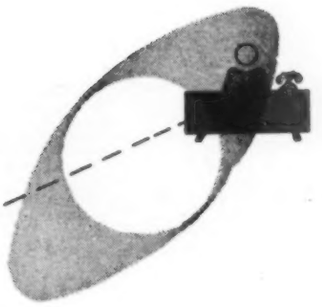
Can those production peaks and valleys be leveled off? That's the $64 question.

Employer, worker, and public alike would benefit from the right answer. *Steady production means economies, greater productivity, more profitable management for employers. For workers, steady jobs. For the general public, a more stable economy, less labor strife, lower prices.*

This the NAM is trying to drive home to its members. If the path toward steady production can be charted, it could soften labor's wage demands. Right now workers aren't worrying about *finding* jobs. But they do wonder if they will *lose* them. Fear of unemployment tomorrow stimulates labor's plea for an annual wage today. Labor leaders feel it is now—while jobs are plentiful—or never.

This is not to say that general wage increases will be foregone. *Not with the cost of living rising two points a month. Means of tying wages to cost of living will continue to be a major issue in new negotiations.*

Looking Ahead in Business



last-minute round-up as we go to press . . .

The nation is now moving along in the third phase of reconversion, the phase of full but unbalanced production. The next few months will tell whether we can correct the distortions and place the boom on a solid foundation.

The first phase of reconversion—clearing the plants and setting up new lines—was practically finished by the end of 1945.

Then, before assembly lines could get rolling, came the second phase—the wage-price battle which tied up a major part of industry in the first half of 1946. Meanwhile, inflationary pressures grew because the shutdowns made shortages worse and did not cut purchasing power much.

What is more, the across-the-board wage boost of 18½c, which settled the strikes, squeezed profits and ruptured the price line.

Now we are well into the phase of full production. Over-all industrial activity has passed 180 on the Federal Reserve Board's index (1935-39=100), is creeping up slowly. Almost all signs point to a high, wide, and handsome boom.

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But, as every factory manager knows, production is not balanced. *And, as every business analyst knows, many of the other elements in the economic picture are out of balance.*

The production picture is distorted by shortages of materials, manpower, and transport, which hold output of many items far below demand. The distortions in prices are illustrated by the fact that manufactured goods prices rose only 25 percent between January, 1941, and July, 1946, while hourly factory wages rose 60 percent and farm prices almost doubled.

Distortions in production and prices twist the profits structure, squeezing profits in many hard goods lines while boosting them to record heights in such lines as farming, department stores, clothing manufacture.

That these and other distortions have arisen to plague reconversion should surprise no one. A war inevitably brings great economic, social, and political upheavals which have to be worked out and which hit particularly hard in the early post-war period. So far, the tremendous pent-up demand for goods and services has carried us over the bumps in the reconversion path. And demand still looks strong enough to carry the boom at least to the middle of next year.

Nevertheless, the possibility that we may stumble into a recession sometime in 1947 shouldn't be overlooked. *It may well be that nothing short of a recession will place the boom on a solid footing.*

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One of the ways that distortions in production and prices show up is in the inventory position of manufacturers, wholesalers, and retailers. What is more, inventories can have a major effect on production and prices if they get out of hand.

On V-J Day, inventories were $9-10 billions short of the level justified by post-war sales targets. Moreover, they were badly balanced. In the year following V-J Day, less than half of the deficiency in inventories was made up and the lack of balance, if anything, worsened. *Consequently, most of the problems of straightening out the inventory still lie ahead.*

Manufacturers have been stocking up on items in plentiful supply in the hope that items in short supply will soon begin to come through in greater volume so that inventories can be balanced and planned production goals attained.

But, if the picture continues to be distorted, manufacturers may be forced to cut schedules to the levels justified by receipts of shortage items.

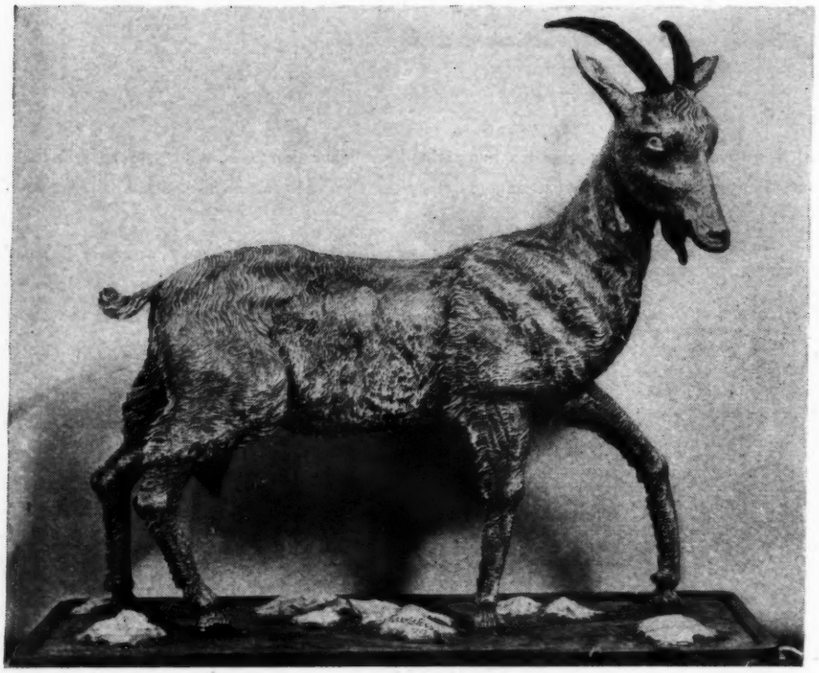
If, at about the same time, retailers and wholesalers decide to dump part of the stocks they have been holding because they see signs of price-softening, new orders will take another drop.

If other demands are not strong enough to fill the gap left by cancellation of orders to fill inventories, production schedules will be slashed. *This would cut employment, reduce incomes and spending, and perhaps even start a recession.* Such a recession shouldn't be very severe because stocks would soon be down to working levels.

So far, there's no conclusive evidence that we'll run into enough trouble over inventories to require a recession to straighten things out. *But it will pay to watch inventories carefully in the next few months for advance warnings or possible danger sometime in 1947.*

operating shorts

Readers are invited to contribute brief articles, illustrated when possible, reporting out-of-the-ordinary operating accomplishments. Accepted articles will be paid for



It is no cause for rejoicing when Elsie Boner joins a department at Liquid Carbonic. She visits only when someone loses time through an accident

'ELSIE BONER' POINTS UP LOST-TIME ACCIDENTS

Elsie (L. C.) Boner represents accidents at Liquid Carbonic Company, Chicago. She appears in a department when someone loses time through an accident, because she is at home only near unsafe conditions or practices. She does not leave a department until all hazards are removed and conditions are pronounced safe by a member of the Safety Committee.

Workmen at LC want nothing to do with this trouble-seeking creature, whose appearance in a department is a subject for comment by all workers in the plant.

A safety committee of three permanent members is keeping Elsie (L. C. for Liquid Carbonic) on the run. Recently the company's pattern shop received an award for completing 5000 safe days of work. A toolroom has amassed 480,000 man-hours without a lost-time accident, which is close to the all-time company record. Five other departments have records of 250,000 accident-free man-hours, or better.

The antics of Elsie make plenty of copy for the house organ, and her picture is frequently displayed. That unruly look in her eye seems to say, "Better watch out for accidents," and that's just what her company's employees are doing constantly.

PILOT LIGHT INDICATES BLOWN HEATER FUSES

JOHN D. MONROE, Foreman, Electrical Maintenance, Renton Division, Boeing Aircraft Co., Renton, Wash.

Considerable loss of production was incurred in the heat-treating department every time a fuse was blown by a defective heating unit. Each heat-treating tank is heated by a bank of thirty-six 8.3-kw. heating units connected to a 440-volt, three-phase service.

On several occasions a breakdown of one unit would cause a fuse to blow, thus reducing the heating capacity one-third, with subsequent lowering of the tank temperature. This drop would continue until the operator noticed the falling temperature on the recorder. Then the maintenance department would be called to make the necessary checks and repairs.

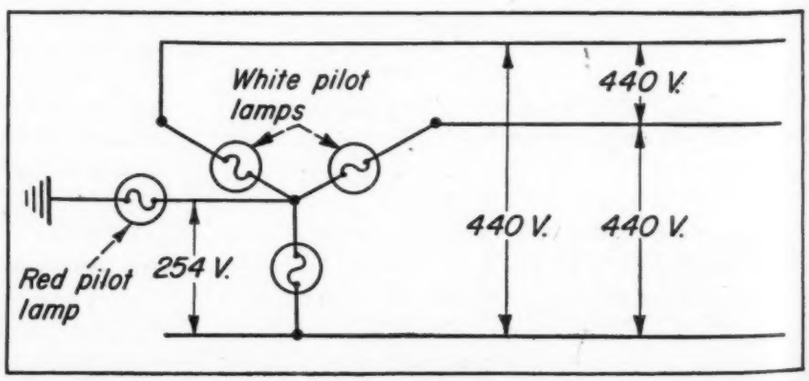
To facilitate immediate detection of trouble, and subsequent quicker repair with less loss of production, a bank of pilot lights was connected to the load side of the fuses, with one to ground, as shown in the sketch below.

Since the distribution is a four-wire, three-phase system and the load is balanced, the grounded pilot lamp will not light until this arrangement is upset. Immediately upon the opening of one phase, the corresponding pilot light goes out and the red warning lamp lights, giving the alarm. With this arrangement the trouble is detected immediately, repairs can be made quickly, and considerable production time is saved.

TRAFFIC LIGHTS IN PLANT ALLOW SPEED WITH SAFETY

SOURCE: Allison Division, General Motors Corporation, Indianapolis

Traffic lights, similar to those with which every motorist is familiar, have been installed as the answer to interplant traffic problems in this large organization. There is one important



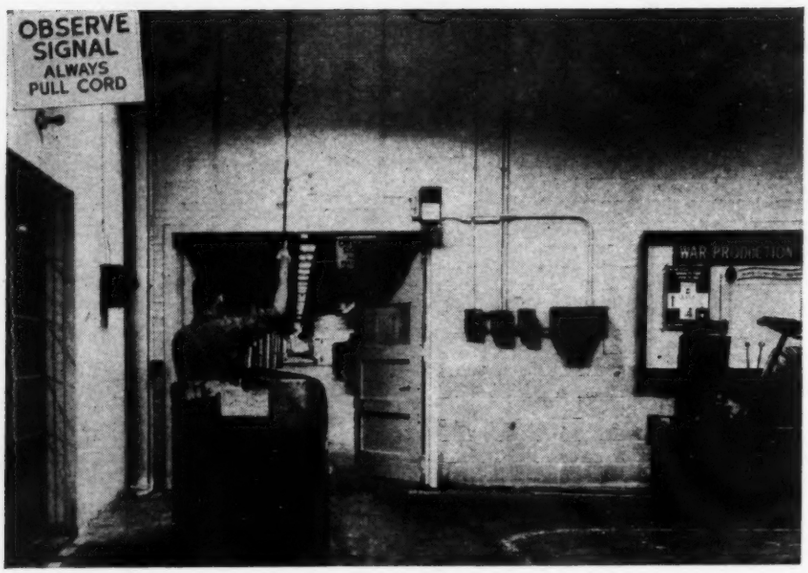
EXIDE-IRONCLAD POWER MEANS STARTING POWER, LIFTING POWER, AND LASTING POWER . . . .

Exide-Ironclad Batteries are specially designed and ruggedly built to meet the increased service requirements of the modern electric industrial truck . . . the efficient, time-saving, cost-cutting method of materials handling.

Exide-Ironclads have the *high power ability* needed for frequent "stop and go" service. Their *high maintained voltage* throughout discharge assures a uniform rate of operations in handling light or heavy loads. Their *high capacity* provides full shift availability, and their *high electrical efficiency* keeps power costs at a minimum. For dependability, safety, long-life and ease of maintenance, you can always count on Exide-Ironclad Batteries.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of materials handling problems. Tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
Exide Batteries of Canada, Limited, Toronto



Traffic light over door is operated by approaching truck driver by pulling the cord, which automatically opens the doors as it flashes the green light

difference, however—here the pedestrian or shop-truck driver operates the signal himself.

Twenty feet from every intersection where traffic lights have been installed is an easily accessible pull cord. When it is pulled, a timer is actuated and the green light flashes in favor of the operator, and intersecting traffic gets a red light. Unless the cord is pulled again the lights go out automatically at the end of the time cycle.

Further, if a door is involved at the intersection, the same cord operates an automatic door opener.

PERSONNEL ROSTER BUILDS TEAMWORK

R. OAKLEY KENNEDY, New York City

Employers today recognize the benefits to be derived from encouraging their workers to feel that they are not merely numbers, but individuals—active, participating members of the business. Here is one simple way to do this that I have used and found to be helpful.

The finest clubs throughout the country usually post in a conspicuous place an attractive, dignified membership list. Members take pride in seeing their names, together with the friends with whom they work and play. With this idea in mind, we placed in each department of our plant a roster bearing the names of the members making up the department. They were listed in numerical order so that when changes occurred the whole set-up did not need to be rearranged, but the numbers appeared on the back of the board, rather than on the front.

There are a number of name boards offered to industry and to clubs, many of which are dignified and yet inexpensive. They have been used in many plants during the war to list employees in service. Now these name boards can be made over to show the membership of the department, thus building up a feeling of pride in participation as an active, responsible member of the organization.

FITTING TIGHT NIPPLES IN COMPRESSED AIR LINES

H. B. McDERMID, Cincinnati

Sometimes a compressed air hose is too tight to fit easily on the nipple. Water on the nipple, or a little soap, sometimes helps—but not enough if there are many nipples to install.

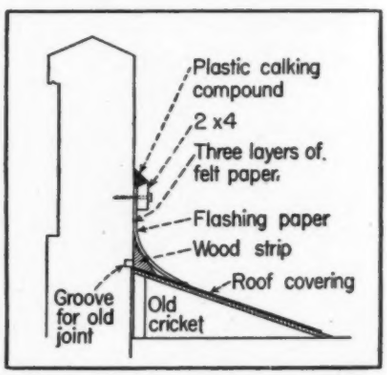
Here is a solution: Take a rod 8 or 10 inches longer than the nipple, and large enough to slip through it. Cut a thread on one end somewhat longer than the nipple. Prepare the nipple by grinding the entering end tapering, and by notching the sides so that the hose will be forced into the rough spots when the clamping device is applied.

With the hose lightly clamped in a vise, place nipple and rod in position, with nut on threaded end of rod against threaded end of nipple. Tighten vise so it grips the plain end of the rod inside the hose, then with the nut, draw the nipple into the hose as far as needed.

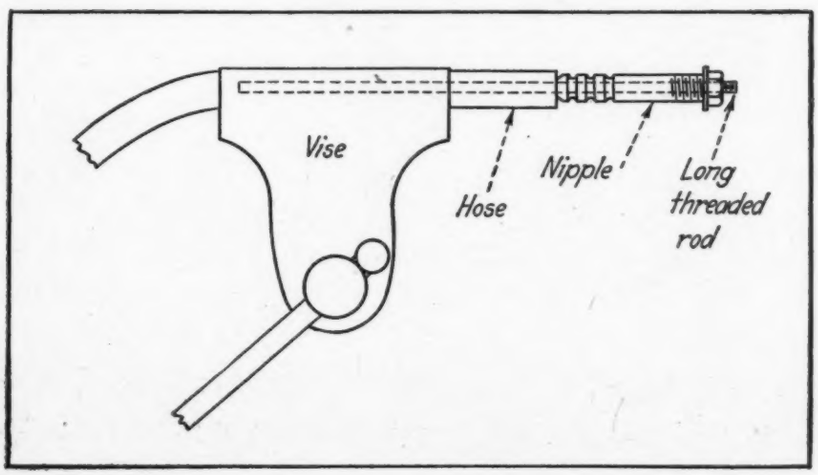
DIFFERENT FLASHING SOLVES LEAKAGE PROBLEM

E. V. LEWIS, Assistant Plant Engineer, American Optical Company Southbridge, Massachusetts

A leaky condition around the flashing of a building that has a parapet wall had long given trouble. A groove had been left in the back of the wall and the felt from the tar and gravel roof had been laid into the groove and wedged in. Several materials had been tried as a wedge, but none proved satisfactory or lasted very long.



About a year ago it was decided to try out a new method of flashing. A piece of 2x4 with a bevel cut in the top was loosely attached to the wall with



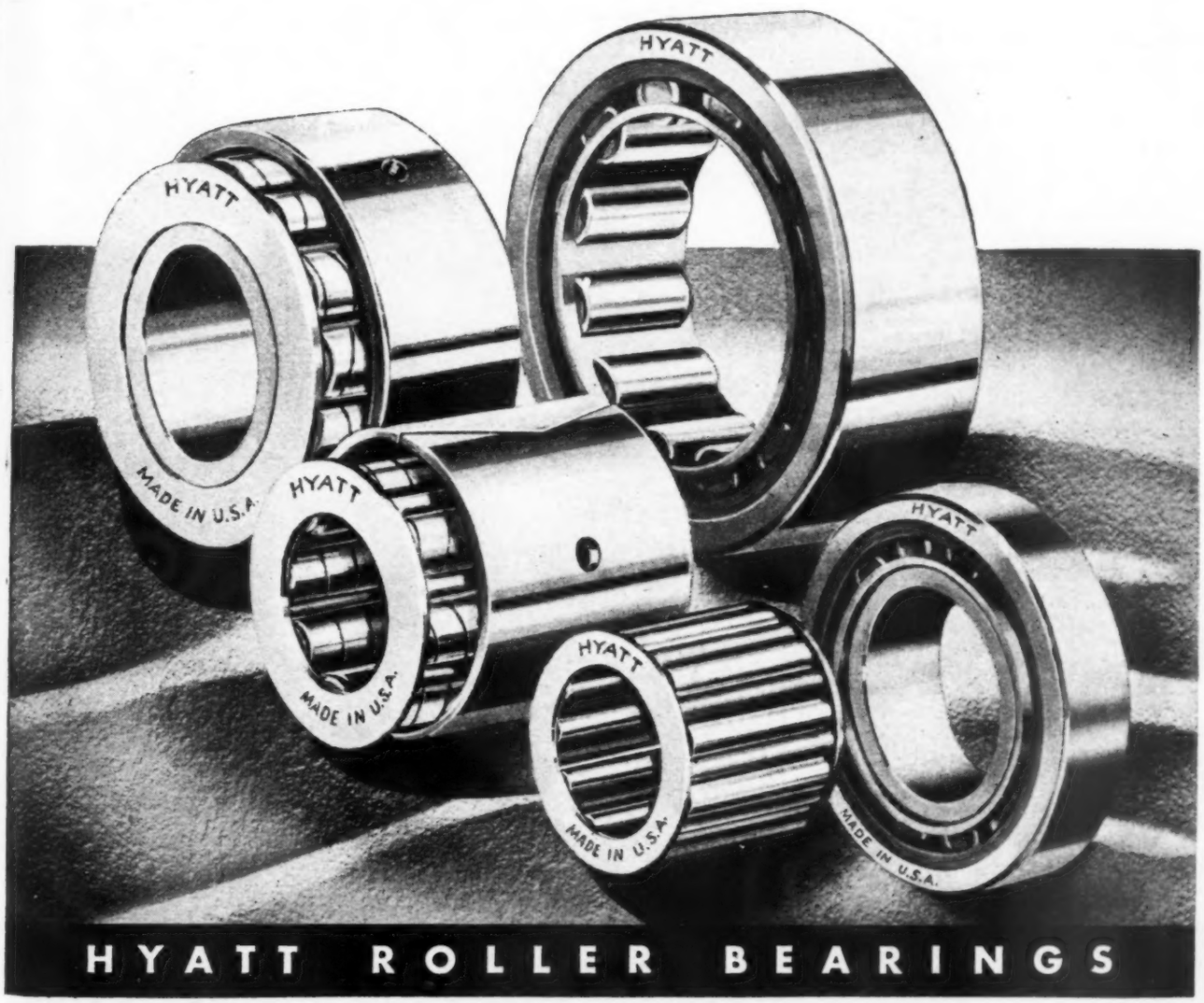
QUOTE—
"HYATT EQUIPPED"

A standard phrase that answers bearing questions in the affirmative.

Leading manufacturers of machines and equipment covering diversified fields quote "Hyatt-Equipped" when they refer to bearing specifications.

Hyatt originated the roller bearing and Hyatt has continued to keep ahead so that it can be truly said—"There is a Hyatt Roller Bearing for every application."

Specializing in roller bearings for fifty-four years, Hyatt engineers have the answers. So put your bearing questions up to them. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



HYATT ROLLER BEARINGS

lagscrews. Then three layers of roofing felt were mopped in with asphalt pitch and covered with a heavy roofing paper, which was used as flashing, as shown in the illustration. The upper edge of the flashing paper was put under the 2x4, and the lagscrews were tightened. Next, the outer edge of the flashing paper was bonded with the old roof covering, after the latter had been scraped and cleaned. In order to make the paper lie evenly, and prevent sagging and cracking, a suitably shaped strip of wood was laid on top of the old cricket, at its juncture with the wall.

The job was finished by filling the bevel at the top of the 2x4 with plastic calking compound, painting the wood, and covering the exposed felt paper with asphalt and gravel.

The new flashing does not interfere with the old in any way, since it is above it.

This sample installation worked out so well that it was decided to apply this method of flashing to roof on the entire building.

RECLAIMS PUMP SHAFT SLEEVES BY WELDING

EMIL WITTMANN, Philadelphia

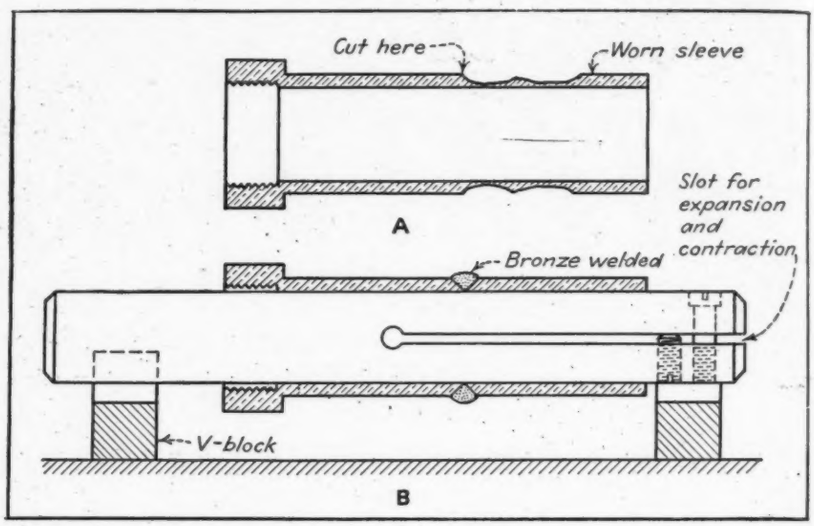
It was formerly the practice of the repairmen to discard the bronze shaft sleeves of several large centrifugal pumps when they become worn, and replace them with new ones. These sleeves protect the pump shaft from the liquid that is being handled, and from stuffing box wear. In time, however, contact of the packing with these sleeves wears them to such an extent that they can no longer serve their purpose, as shown at above.

Some time ago it was decided to recondition these sleeves by bronze welding. By so doing, savings in both time and money were realized.

To rebuild a sleeve, two old sleeves are cut in two, a section from each one is beveled, and the two pieces are assembled on a mandrel for bronze welding all around the V, as shown at B. The welding mandrel prevents the sleeve from warping and closing in. It is coated with graphite to prevent tinning. Also, as will be seen, one end is slotted in order to permit it to be expanded and locked by means of two screws, so that it will fit the sleeve tightly. When the work is to be removed one of the screws is loosened and the other tightened to contract the mandrel.

After welding, the sleeve is put on a turning mandrel, the excess metal removed, a light truing cut is taken, and the sleeve is polished and put away in spare parts stock.

Experience has shown that the bronze welding does not affect the wear resistance of the sleeves. In service they show no excessive wear and perform their function in a very satisfactory manner.



EASY WAY TO REPAIR CERAMIC WARE

W. F. REES, Maintenance Engineer, Hercules Power Company, Radford, Va.

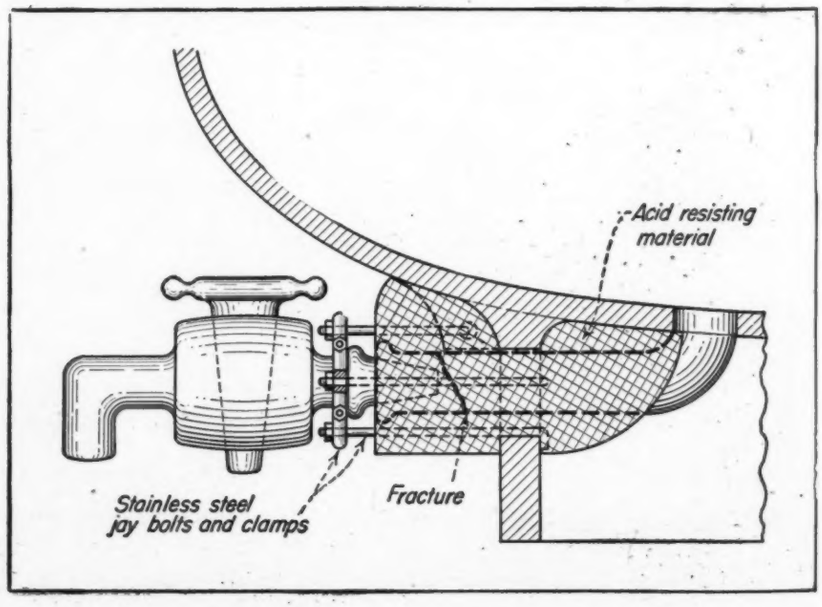
Making satisfactory repairs to ceramic chemical ware that handles strong acids usually presents difficult problems. Such a problem confronted us some time ago when the discharge nozzle of a vacuum filter pot was broken. Unless suitable repairs could be made, it would be necessary to shut down one unit of the plant until a new pot could be obtained from the manufacturer, which would have required several months. Therefore, it was decided to make the following repairs.

All the broken pieces were carefully fitted together and held in place by stainless steel clamps and bolts, as shown in the illustration below. The parts were carefully cleaned and all glazed surfaces were removed with a coarse grinding disk. A sheet metal form was then fitted around the broken area allowing about 1½-in. clearance. All crevices were filled with clay.

An acid-resisting proprietary material containing sulphur and asphalt was melted and poured into this mold. After the material had cooled and the metal form had been removed, the surface was carefully examined for pinholes and was then polished with a sanding wheel.

The same procedure was followed in making repairs to a broken ceramic plug cock.

In both instances the parts on which these repairs were made have stood up perfectly.



Precisionbilt LIKE A GIANT REFLECTING TELESCOPE

J&L WIRE ROPE

PERMASET PRE-FORMED

A giant reflecting telescope is built with precision. J&L Permaset Pre-formed Wire Rope is also Precisionbilt by men of experience and skill using the finest materials.

J&L Wire Rope is made of J&L Controlled Quality steel. Our engineers will be glad to discuss your requirements with you. Write for further information.

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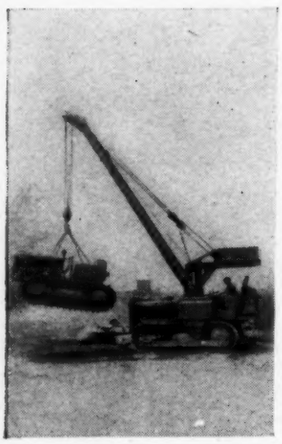
PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

materials handling — II

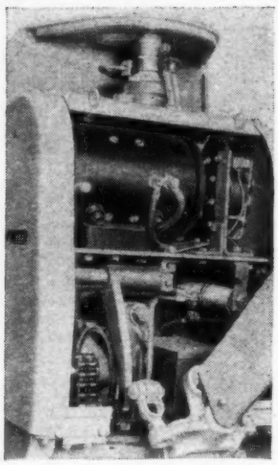
Materials handling equipment, including power trucks and accessories, and cranes, introduced to you during the past 12 months in the department, What's New in Equipment, is reviewed here to give you a quick one-year summary



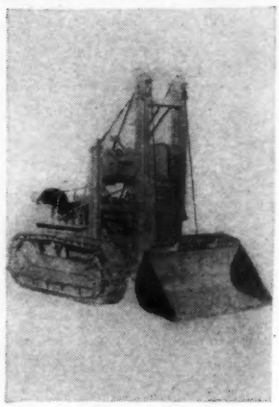
CRANE—Model MC-8 Roustabout is a mobile full-swing boom crane, tractor mounted, handling loads up to 10 tons. Booms of standard lengths from 15 to 30 feet are furnished. Ball-bearing boom turntable and all gears and clutches run in oil, fully enclosed. Boom swing and hoist and load hoist are independent actions, with separate controls and automatic brakes. Unit is suitable for loading, unloading, moving, or stacking heavy, bulky objects. The Hughes-Keenan Company, Mansfield, Ohio.

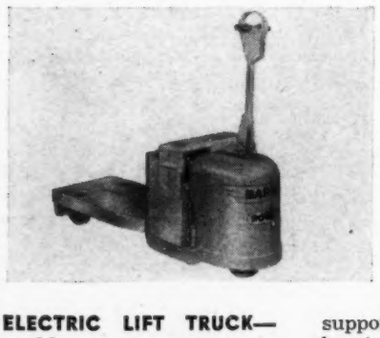
ELECTRIC LIFT TRUCK—The Worksaver electric truck can be maneuvered in congested areas. Picks up and transports loads up to 3 tons by fingertip pressure on dual cam controls located beneath hand bar-grip. Two forward and two reverse speeds are provided. Elevating unit consists of high-torque electric motor operating high-pressure hydraulic gear pump, which in turn activates a ram. Lifting and lowering is controlled by switch on battery compartment. The Yale & Towne Manufacturing Company, Philadelphia.

ELECTRIC HAND TRUCK—features hydraulic lift pump, which speeds loading, and a redesigned brake claimed to be four to five times as powerful as that on manufacturer's previous model Transporter. One stroke on lift pump engages loaded skid with standard 1-in. clearance. Low-pressure (high-speed) cylinder for raising platform into contact with skid or pallet is combined with high-pressure (low-speed) cylinder for raising the load. Automatic Transportation Company, Chicago.

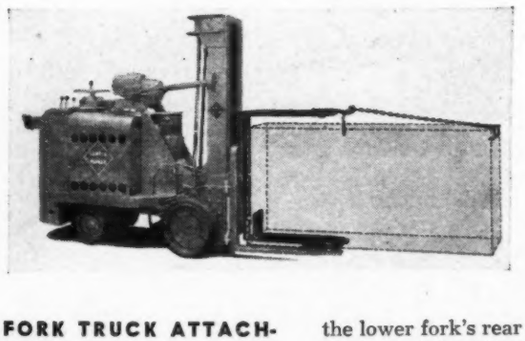


EXCAVATING AID—Traxcavator Model IT4 has a standard bucket of 1-cu.-yd. capacity for digging, excavating, grading, loading, and materials handling. Mechanical hoist, for stockpiling or dumping into trucks, is driven from the front power take-off of the tractor through V-belt drive. Bucket can be dumped from any point of the lift. Digging range is from 14 inches below track line to 56 above. Trackson Company, Milwaukee.





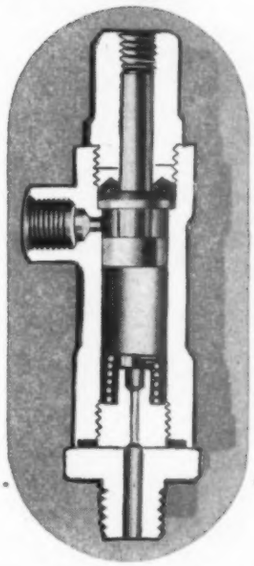
ELECTRIC LIFT TRUCK—enables one operator to handle loads of 4000 and 6000 pounds. Features heavy-duty, high-torque, compound-wound motor driving a large diameter, wide-face front wheel through a double reduction precision roller chain drive. Motor and jackshaft are supported on sealed ball bearings. Automatic automotive type brake stops truck with handle in either vertical or horizontal position. Full 4-in. vertical lift accomplished in 4 seconds with heavy-duty aircraft type hydraulic direct-connected gear pump. Barrett-Cravens Company, Chicago.



FORK TRUCK ATTACHMENT—includes a small turntable bolted to the truck's lower forks to support the load and permit it to be swiveled for maneuvering through boxcar doorways or stowed in corners against walls. An overhead fork is bolted to the lower fork's rear framework, and is adjustable to height of load. A chain extends from the outer end of the upper fork, and a hooked clamp on the end of the chain fits down over the edge of the load. Elwell-Parker Electric Company, Cleveland.

CONTINUED ON PAGE 168

This Lubrication Problem was Licked in a Hurry



YOU'RE LOOKING at a "Sandslinger," a machine that rams sand into huge casting molds. Because it must operate in sand and grit, the protection of the machine's bearings is a major lubrication problem.

This problem was solved in a hurry by York Ice Machinery Corporation, York, Pa., world's largest makers of mechanical cooling equipment. With the installation of an Alemite LubroMeter Centralized Lubrication System on their "Sandslinger":

1. All hazards of faulty lubrication are ended.
2. All 41 bearings are safely and positively lubricated from one point, at one shot, in 1 minute while the "Sandslinger" is in operation.
3. The 2 hours formerly lost in greasing now becomes 2 hours *more productive time.*

If you have a problem of applying lubricants or oils to bearings you'll be interested in what Alemite Systems can do for you. The LubroMeter System is just one of 4 Alemite developments. It is a single line terminating system with the valves mounted directly in the bearings. It handles grease or oil and is extremely economical in initial cost, installation and operation.

Have an Alemite Lubrication Specialist demonstrate one or all four systems right at your desk with transparent working models. Call the Alemite Distributor nearest you, or write Alemite, 1870 diversey Parkway, Chicago 14, Illinois.

Alemite LubroMeter Feeder Valve

Fully hydraulic—Only 2 moving parts—Indicator on each valve—Lubricant delivery easily adjustable—Valve is of heavy-duty construction with hardened steel piston—Available in a variety of sizes and types.

Another Product of STEWART WARNER

ALEMITE

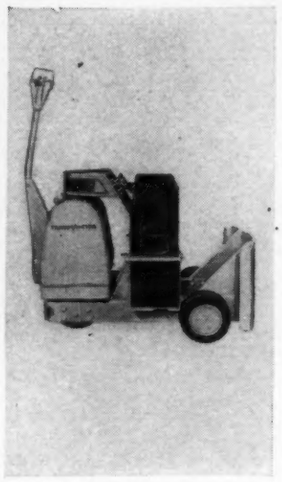
REG. U.S. PAT. OFF.

Alemite ALONE Combines all 3 in Lubrication

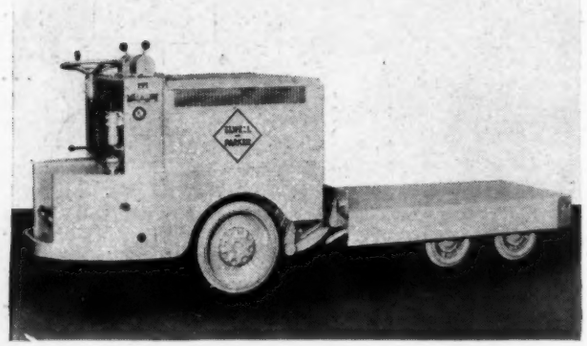
1. EQUIPMENT 2. PROCEDURES 3. LUBRICANTS

FORK TRUCK—of 4000-lb. capacity, known as Type AIMH, steers by "articulating" or hinging the frame, permitting swinging the load to line it up in position without lining up truck itself. All electric controls, together with the hydraulic pump, pump motor, steering, lifting, and tilting valves, are grouped in panel box. Power equipment consists of standard battery enclosure with removable top and side plates. Frame is high tensile steel. Baker Industrial Truck Division, The Baker-Raulang Company, Cleveland.

HAND TRUCK-TRACTOR—Electric-propelled Transtractor is a push-pull type unit, equipped with a heavy-duty bumper plate for pushing, and a coupler is available for towing operations. It is constructed to pull or push a 6000-lb. trailer load all day, or up to 20,000 pounds intermittently. Pushbutton control and front-wheel drive enable one man to handle any size or type of load. Drive brakes are applied by return of guide handle to upright position. Automatic Transportation Company, Division of Yale & Towne Manufacturing Company, Chicago.



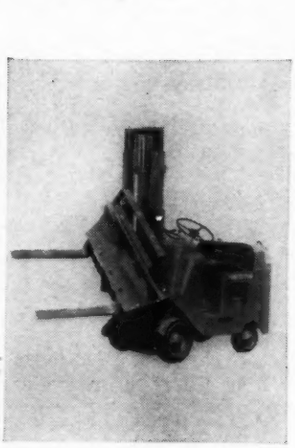
INDUSTRIAL TIRES—Made with a synthetic rubber compound, tires are available in standard sizes, in both the Vulc-On and Pressed-On types. They are claimed to resist the destructive action of oils, greases, and brines; to reduce rolling resistance; and to have maximum resistance to cutting and chipping. The B. F. Goodrich Company, Akron, Ohio.



INDUSTRIAL TRUCK—Low-bodied, 10-ton truck, driven by storage batteries and electric motor, is said to give operator complete view of platform, load, and surroundings. Over-all length is 147 inches, width 45 inches. Four wheels under platform provide load stability, and six-wheel steering permits turns in aisles 71 inches wide. According to the manufacturer, speed may be accelerated to 6 miles an hour, while the truck can come to a dead stop within a few feet. Electric drive and controls provide flexibility. Elwell-Parker Electric Company, Cleveland.

LIFT TRUCK—Compact, lightweight fork truck, known as Trucloader, lifts, carries, stacks, and tiers unit package loads weighing up to 1000 pounds. Adapted for fast loading and unloading of highway trucks and trailers, it has turning radius of 57 inches. Utilizes the principle of unit loads packed on suitably designed pallets. Clark Tructractor Division, Clark Equipment Company, Battle Creek, Mich.

LIFT TRUCK—Model LT-35 lift truck has a side-mounted motor, and lifting and tilting mechanisms are hydraulic. Weighing 2800 pounds, truck can lift, carry, and stack a 1500- or 2000-lb. load in tight aisleways, highway trucks, and freight cars. Operates on 2-ton capacity elevators and in multi-story buildings. Seat is front- and rear-protected. Two wheels on steering axle permit short turning radius. Towmotor Corporation, Cleveland.

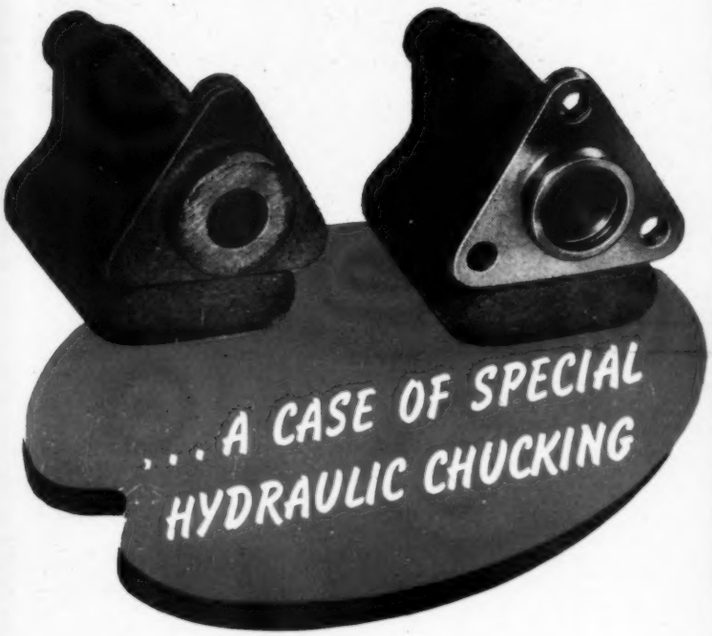


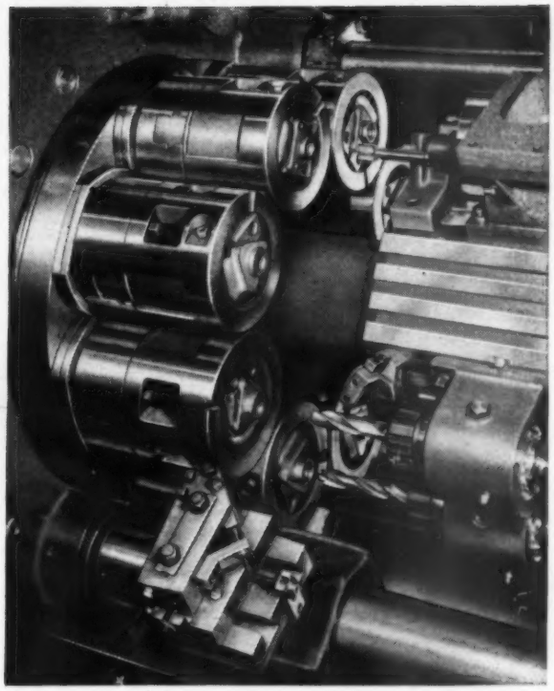
LIFT TRUCK ACCESSORY—turns or "up-ends" rolls of paper from vertical to horizontal position, or vice versa. Constructed of steel bars and angles, it has a regular elevating carriage as well as a revolving carriage having tapered blade of steel combined with a curved plate to pick up rolls of paper on end. A pair of forks is used for picking up, carrying, and stacking horizontal rolls. Full apron with steel blade is also available. Towmotor Corporation, Cleveland.

LIFT TRUCK UNLOADER—designed for use with maker's trucks, is operated by the driver from his regular position in truck. Two double-acting hydraulic cylinders (one at each side) move the vertical rack forward, pushing the load off the forks. Pulling power of unloader is equal to pushing power, and it may be used to pull dies from a die bed or rack onto the forks, or for loading boxcars. Towmotor Corporation, Cleveland.

CONTINUED ON PAGE 170

LEADERSHIP BASED ON ACCOMPLISHED FACTS





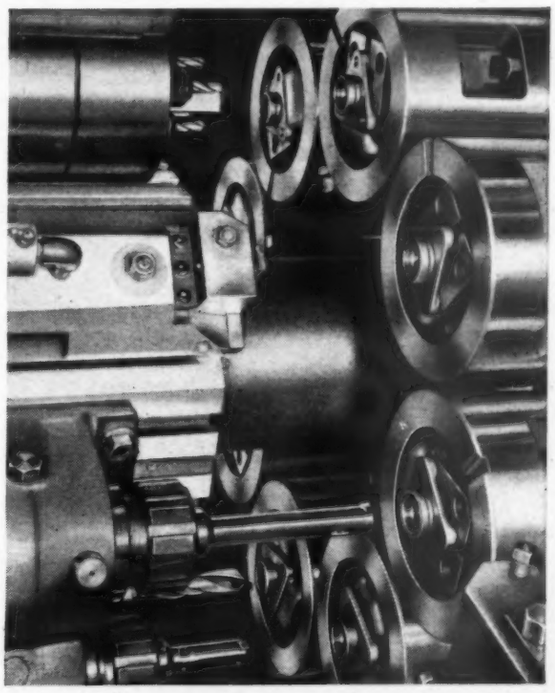
Entirely open end construction...
Loading position easily accessible

The master cylinder and supply tank illustrated above is manufactured by the Wagner Electric Corporation of St. Louis on a Model 88 New Britain eight spindle automatic work rotating chucking machine. The most difficult problem encountered in tooling this job was to synchronize the multiple drill head with the irregular shaped flange for accurate drilling of three mounting screw holes.

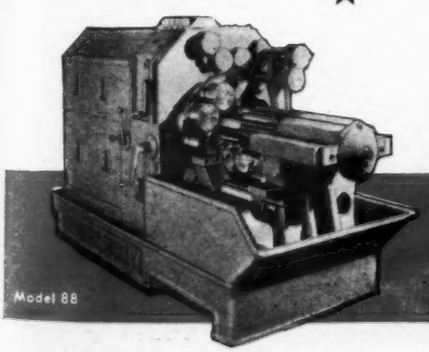
Our engineers developed a special hydraulically operated chucking fixture which positions the piece exactly the same at each chucking - - permitting, with an ingenious locating device, proper synchronization of the drill head and the work. Otherwise the flange holes would have required a separate rehandling and a drill press operation with a resultant increase in the cost per piece.

Let our engineers help you to save extra operations in the machining of your work. Be sure to check with our field representatives or our home office about that new product you are designing or about better methods to machine your present products.

★



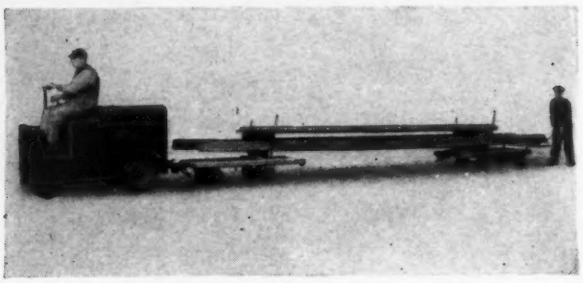
REAR VIEW: Note accessibility of all tools



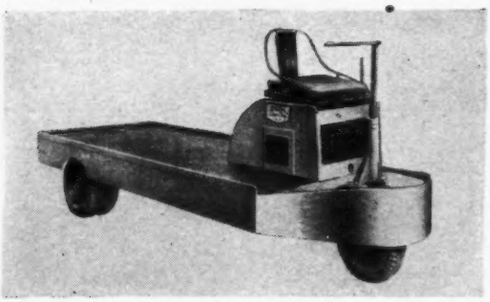
NEW BRITAIN AUTOMATICS

THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT
NEW BRITAIN-GRIDLEY MACHINE DIVISION

M-01040

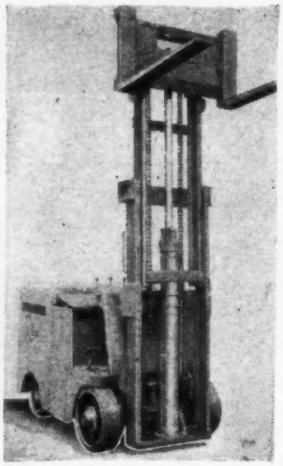


LONG LOAD HANDLER—Swivel Bolster is an attachment for handling loads of steel rods, beams, or other materials too long for one trailer. Consists of two identical assemblies, each of which may be attached to a single caster steer trailer by inserting posts into side rack sockets, to adjust regular handling equipment for the longer loads. Lead trailer is pulled by power vehicle, and rear trailer is guided manually. The Mercury Manufacturing Company, Chicago.

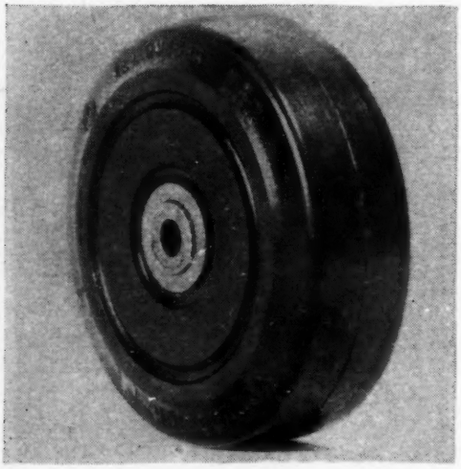


SHOP TRUCK—Model FF Chore Boy is a dual-wheel platform-type shop truck of 1-ton capacity. It has a non-skid deck, and frame is electrically welded reinforced steel. Hand lever controls forward, reverse, and neutral, and steering is by one hand, with convenient foot brake and accelerator. Seat cushion is hinged so that when operator leaves seat, brakes are automatically applied. The Buda Company, Harvey, Ill.

PALLETIZING TRUCK—Model MGVH Palletier electric fork truck incorporates full magnetic contactor control of travel, hoisting, and tilting mechanisms. Foot-operated electromechanical brakes are mounted directly on each driving wheel, and emergency braking is provided. Hydraulic cylinder permits tilting in either direction, 15 degrees backward, 5 degrees forward. Forks are adjustable, and can be reversed. Crescent Truck Company, Lebanon, Pa.



THREE-WHEELED TRUCK—Known as Firebaugh Special, three-wheeled truck for interplant transportation handles half-ton pay loads of 23 cubic feet. Travels up to 35 m.p.h., and runs 60 miles on a gallon of gasoline. Motor uses standard automobile parts. Incorporates fluid drive principle, and speeds are governed by foot throttle. Toolcraft Manufacturing Company, Huntington Park, California.

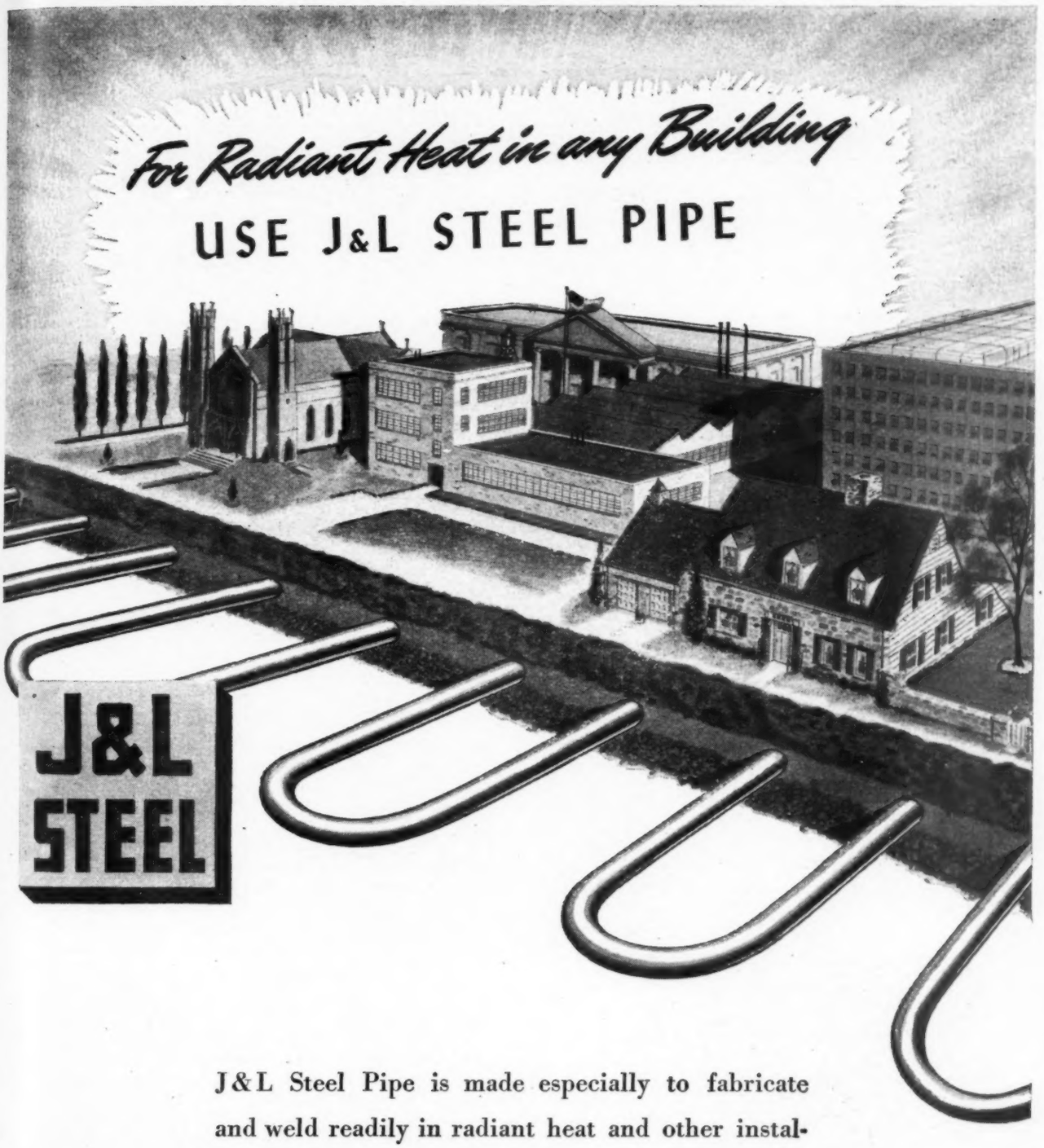


RUBBER WHEEL—is constructed with a metal bearing sleeve molded integrally in a hard rubber core in which ball bearings are mounted. Low power E-Z rolling tread rubber compound is vulcanized to the hard rubber core. Wheels are suitable for use where corrosive agents are present, but they are not recommended where extremely rough usage is encountered. The B. F. Goodrich Company, Akron.

TIERING HAND TRUCK—The Transtacker, a battery-powered high-lift tiering unit, is made in four models for all types of pallets and skid platforms. Handles vertical tiering of unit loads where floor or elevator capacities are limited and maximum maneuverability is essential. Load capacities range from 2500 to 4000 pounds. Truck is electric-powered, with motorized hydraulic lift mechanism. Automatic Transportation Company, Chicago.

For Radiant Heat in any Building

USE J&L STEEL PIPE



J&L Steel Pipe is made especially to fabricate and weld readily in radiant heat and other installations. Your crews will like the way it handles for them. Your customers will appreciate that J&L Controlled Quality Steel Pipe will give them long, trouble-free service.

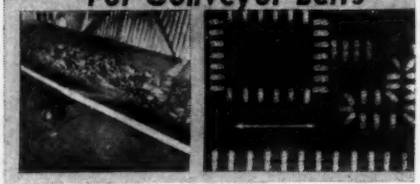
JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Present Day Practice in Belt Fastening

Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization.

For Conveyor Belts



FLEXCO HD Belt Fasteners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips and patches that can be made with these fasteners and Flexco HD Rip Plates.

Bulletin F-100 gives complete details on how to fasten and repair conveyor belts.

For V-Belts

ALLIGATOR V-Belt Fasteners are now being widely used to fasten B, C and D, open-end V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for **Bulletin V-14.**

For Transmission Belts

ALLIGATOR Steel Belt Lacing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to ⅝" thick and as wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts.

Sold by Supply Houses Everywhere

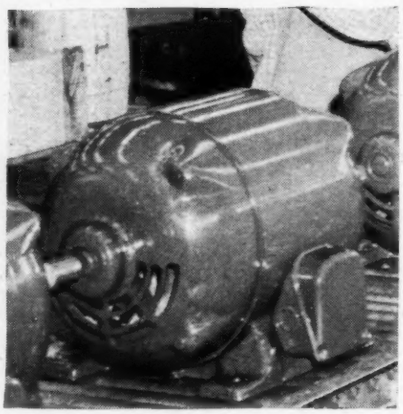
FLEXIBLE STEEL LACING COMPANY
4678 Lexington Street, Chicago 44, Ill.

what's new in equipment

NEW SERIES OF INDUCTION MOTORS

Announcement is made of the introduction of a new series of induction motors designated as Life-Line. Replacement of all cast-iron parts by steel has resulted in a motor that is more than 35 percent smaller than its predecessor, without sacrifice of electrical properties. Sizes of electrical working parts are substantially the same. Starting torques are said to have been increased as much as 134 percent per pound of motor weight, while maximum torques have been raised as much as 116 percent.

The structural steel sections are as thick as they would normally be if made of cast iron. Since the shock resistance of steel is greater than that of cast iron, the new motors are considered to have a marked increase in shock resistance and ruggedness.



Motors are equipped with prelubricated ball bearings which, it is claimed will not require lubrication for 5 years. These bearings are sealed to withstand extremely dirty conditions.

Slots, coils, and connections have been redesigned. Sizes of slots were made greater. Coil extensions have been shortened. These changes were made to facilitate winding by reducing the amount of handling and bending required.

Finish on the outside surfaces of the motors consists of base coats of a baked thermosetting varnish, with a final coat of lacquer. This finish is considered to give adequate protection against corrosion for general application. When corrosive conditions are extremely severe, stainless steel will be used for the shields and hoods.

Interchangeability of parts is a feature that simplifies the manufacture and conversion of different types of motors.

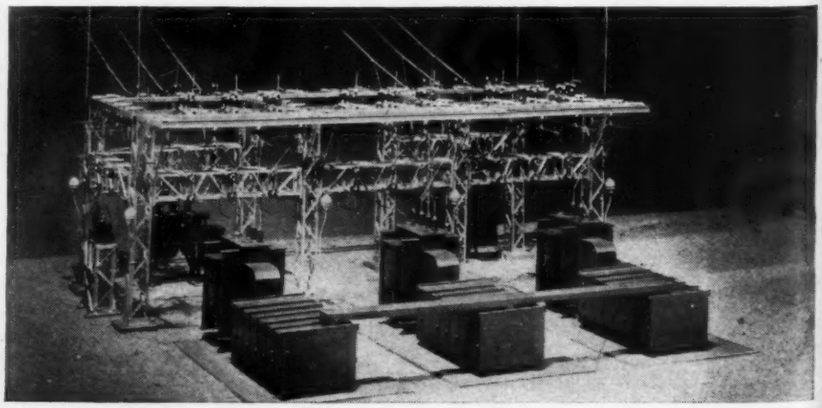
The new series is made in splashproof, open-protected, and totally enclosed, fan-cooled types, in sizes up to 300 horsepower. Westinghouse Electric Corporation, East Pittsburgh, Pa.

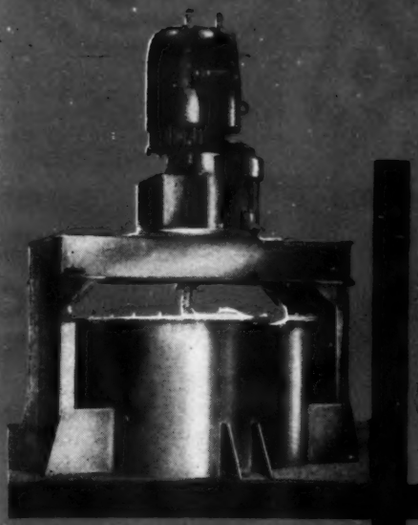
FLUORESCENT LAMPS

Fluorescent lamps in 4500-deg. white are made in all sizes of preheated regular fluorescent lamps from 14- to 100-watt, as well as the instant-start 40-watt T-12 lamp. As an intermediate color between the 3500-deg. white and the 6500-deg. daylight lamp, the 4500-deg. white lamp is suitable for use where a light source warmer in color than the daylight lamp, and of a cooler shade than the 3500-deg. white lamp is desired. The 4500-deg. white 40-watt lamp is rated 52 lumens per watt. The Champion Lamp Works, Lynn, Mass.

PACKAGE SUBSTATIONS

Coordinated, ready-to-assemble package substation units are now available in ratings from 750- to 45,000 kva. Made up of parts previously obtainable on a piece-by-piece basis, often from different manufacturers, these components, made according to standard designs, include transforming, regulating, relaying, metering, and protective equipment. The various parts are shipped in pre-assembled sections, and may be combined in various arrangements to allow flexibil-



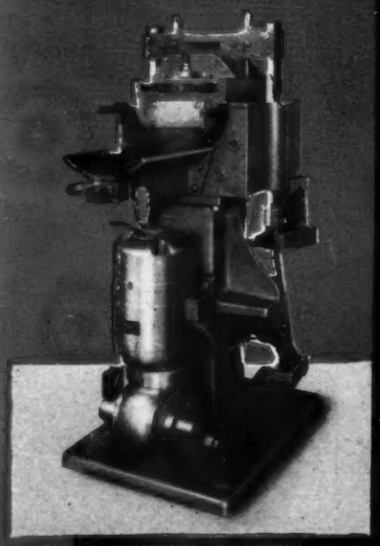


the RIGHT *horsepower*

Available in sizes from 1/10 to 100 horsepower.

the RIGHT *shaft speed*

Gear reduction ratios range up to 432 to 1.



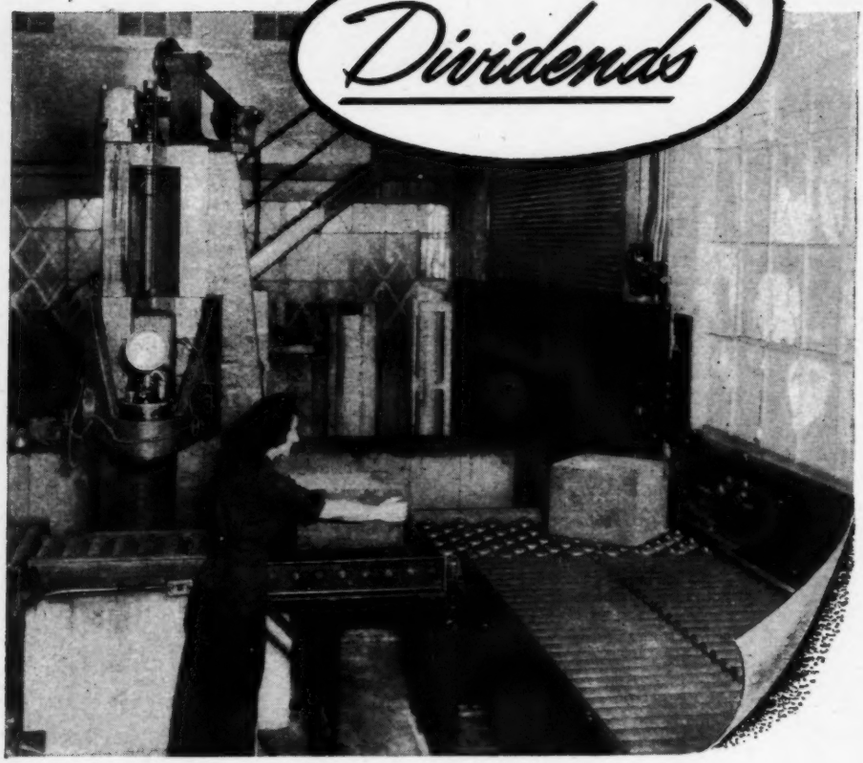
and RIGHT *where you want it*

Master Gearmotors are so compact, so flexible, so adaptable to any type of application. Use them to increase the saleability of your motor-driven products . . . improve the economy, safety, and productivity of your plant equipment. They're the horsesense way to use horsepower.

MASTER GEARMOTORS

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

MATHEWS METHODS ARE PAYING . .



THE outstanding efficiency of manufacturers applying continuous flow handling methods provides proof that these methods are rendering real production service. Gravity and power conveyers and specially engineered conveying machinery usually are combined to make up Mathews Conveyer Systems. Such systems are an investment in greater output, lower costs, and improved employer-employee relations. The conveying equipment provides a steady flow of materials through processing machinery, and reduces manual handling and worker fatigue to a very minimum. It is designed to operate under severe service with very little maintenance attention, and into every section goes the finest of materials and manufacturing skill.

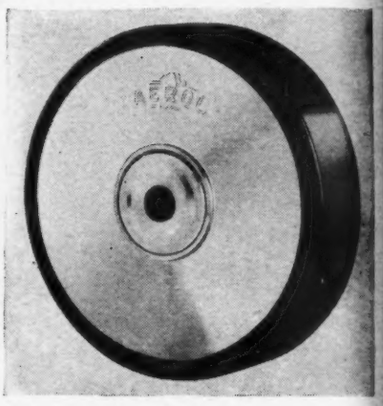
Mathews Engineers have acquired a wealth of experience in dealing with materials-handling problems. The benefit of this experience is readily available to you. Write or wire for field engineering service.

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNSYLVANIA
SAN FRANCISCO, CAL. • PORT HOPE, ONT.
ENGINEERING OFFICES IN PRINCIPAL CITIES

ity for future load changes. In addition to the factory-assembled units, substations include steel structure, lightning arresters, transformers, circuit breakers, disconnecting switches, station lighting, relaying, control cable, and wiring diagram. Apparatus Dept., General Electric Co., Schenectady 5.

RUBBER-TIRED WHEEL

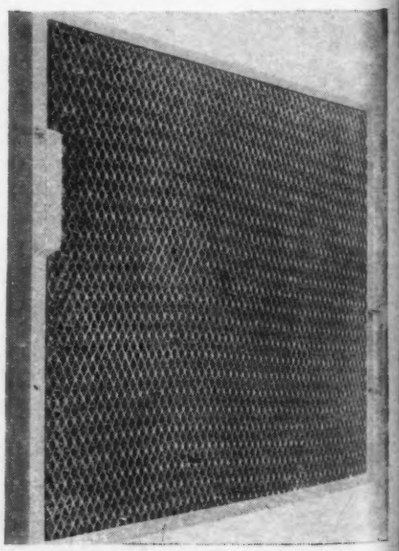
Aluminum alloy rubber-tired wheel embodies double-wall construction for extra strength, and flush design for clean surfaces. The all-purpose solid rubber tires resist oil and water, cannot separate from wheel core, manufacturer says, and



factory-greased Timken tapered roller bearings prevent axle wear and sideplay. Special formed aluminum alloy interlocking retainers are said to keep grease in and dirt out, eliminating greasing and maintenance under normal conditions. Available in range of sizes from 4 to 20 inches. Aerol Co., 1823 East Washington Blvd., Los Angeles 21.

AIR FILTER

All-metal, permanent, cleanable, Agitair FM air filter is designed to perform efficiently at an approach velocity of 432 f.p.m. handling 1200 c.f.m. through a 20x20-in. filter panel. Consists of layers



Here's REAL NEWS for everyone concerned with reducing assembly costs.

"C7000" SPEED NUTS cost less than ordinary threaded nuts plus lock washers.

Samples and prices are ready to go-we're waiting for your request.

THESE NEW C7000 self-locking, flat type SPEED NUTS are made in 10 standard sizes for machine screws and sheet metal screws

TINNERMAN PRODUCTS, INC. • 2096 FULTON ROAD • CLEVELAND 13, OHIO

Speed Nuts* PATENTED

MORE THAN 3000 SHAPES AND SIZES

*Trade Mark Reg. U.S. Pat. Off.

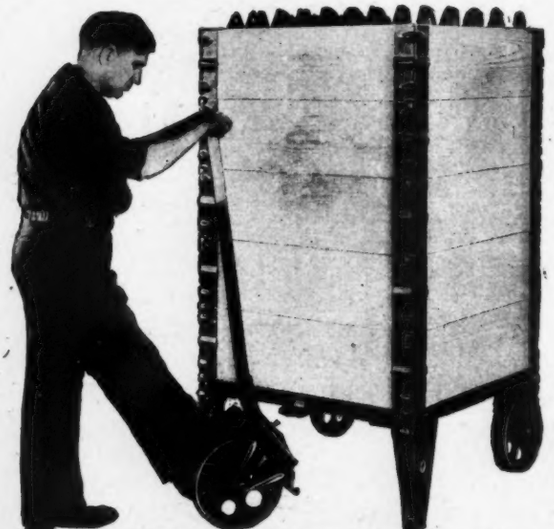
FASTEST THING IN FASTENINGS

This really rugged Die Rack is one of many offered by the TURNER SYSTEM. Fits on Turner Transport. Space for larger dies at lower levels—smaller dies above.

The Finest Die Racks Made

Protect Your Dies and Save You Money When You Use

THE TURNER SYSTEM
OF MATERIALS HANDLING



"DELIVER THE BIN AND SAVE THE HANDLING" with the Turner System. Wooden-Side or All-Steel Bin Sections, Racks, Trays and Die Tables fit on the Turner Transport which is moved by hand "Jimmy," power lift truck, crane or tractor.

Perfectly designed for better handling, protection and storage of all types of dies, the specially built Racks of the Turner System offer you exceptional time and labor saving features. Each of these Racks fits on the TURNER TRANSPORT so the entire unit may be moved to any part of the shop where dies are removed as required. Racks fit one on top of another for increased capacity—or storage. Shelves may be inverted to form trays.

60 DAYS FREE TRIAL
In Your Own Plant

We will ship an assortment of standard units on 60 DAYS FREE TRIAL. Use them two months. The trial costs you nothing except nominal transportation charges. Write today for this assortment. Complete information follows immediately.

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of expanded metal disposed to induce turbulent cyclonic action of the air within the filter, creating a centrifugal wiping action against all viscous surfaces of the media. Operates at high velocities with sustained low resistance to air flow, and maximum dust-holding capacity. Frames are constructed of cold rolled steel, and arc welded. Removable for cleaning and servicing. Air Devices, Inc., 17 East 42nd St., New York 17.

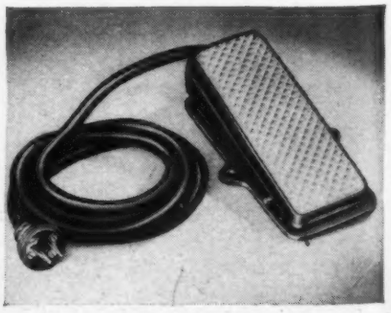
INTERCOMMUNICATION UNIT

Model 1100 intercommunication station includes a patented audio-amplifier circuit, alnico speaker, neon pilot lamp, and vinylite insulated moisture-proof interior wiring. Used in a system of 12 stations, the unit provides facilities for private 2-way voice communication for up to 6 independent conversations at the same time. Pushbuttons identifying each

station permit selecting calls without having to wait for switchboard connections. By flicking a toggle switch, calls can be received and answered from across the room, without approaching the unit to depress the talk key. An automatic light signals when the station called is busy. A variable volume control provides adjustable power-output to cover noise level areas. Executone, Inc., 415 Lexington Ave., New York 17.

FOOT PEDAL SWITCH

Foot-operated switch for series circuits has been developed for use with timer or other equipment requiring control of power while permitting freedom of the operator's hands. The switch is constructed of cast aluminum, and screw



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BRONZE BEARINGS ☆ BUSHINGS ☆ PRECISION BRONZE BARS

Make the

CRITICAL ACCURACY

you build into your machines

EASY TO MAINTAIN

MOST EQUIPMENT MAKERS who utilize Lam inum in accurately fitting gear mesh and bearings do so primarily to reduce precision machining. But the same shim also assures accuracy of future service adjustments... too important to overlook. Bulletin on request.

Laminum shims are cut to your specifications, but for maintenance work, shim materials are sold through industrial distributors.

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LAMINUM

THE SOLID SHIM THAT peels FOR ADJUSTMENT

holes permit fastening to floor or machine. Treadle is diamond plate, non-slip type; switch has heavy rubber cord with non-shattering male plug. Mechanism is snap-action type, and can be supplied single pole, single throw, either normally open or normally closed as long as treadle is held depressed. Also available single pole, double throw. Power handling capacity is 1000 watts at voltages up to 220 a.c. or 32 d.c., non-inductive loads. Electronic Controls, Inc., 44 Summer Ave., Newark, N. J.

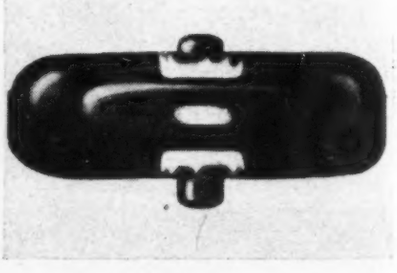
ELEVATING TABLE

Telescopic cylinder provides an elevating range from 28 to 50 inches, or a total lift of 22 inches in hydraulic elevating table. The strength and rigidity of the central column has not been lessened, maker says. In handling dies, jigs, and fixtures, the telescopic feature permits leveling with press beds and storage racks, allowing easy transfer; also when

used in assembly operations and as a transfer member in a conveyor line. Except for cylinder and guide sleeves, standard elevating table parts are used. Optional extras available include 2-speed foot pump, demountable roller top, telescopic towing handle, die separator, indexing device, and retaining bars. Lyon-Raymond Corp., 2795 Madison St., Greene, N. Y.

SAFETY SWITCH

Double-pole, single-throw push-through cord switch is designed to operate on electrical devices rated up to 2500 watts a.c. or d.c., 125 or 250 volts, and carries Underwriters' Laboratory Listing of 20 amperes at 125 volts. Switch mechanism consists of snap-action over-the-center spring-controlled tapered shaft, operated



HYSTER INDUSTRIAL TRUCK SERVICE COVERS THE WORLD

HYSTER factories and Hyster dealers believe in follow-through. That's why, when you purchase a Hyster industrial lift truck, you can depend on prompt service whenever parts replacements or mechanical adjustments are needed.

Hyster makes lift trucks to the highest standards in design, engineering, materials. But any machine that takes the beating of hoisting, transporting and stacking heavy loads every day needs skilled attention on occasion. Hyster dealers know this. They know also that a Hyster temporarily out of service for lack of parts or repairs is time and money lost for its owner.

Your Hyster dealer is a good man to know. He services—as well as sells—Hyster pneumatic tired industrial trucks with capacities ranging from 2000 to 30,000 pounds.

HYSTER COMPANY

2956 N. E. Clackamas, Portland 8; Oregon
1856 North Adams Street, Peoria 1, Illinois

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Sold and Serviced Through Distributors in Principal Cities All Over the World

World's Largest Manufacturer of Pneumatic Tire Lift Trucks and Straddle Trucks

Contains pictures, charts, specifications and text covering the Roto-Clone method of process dust control as applied to a wide variety of industrial dust problems

THE Roto-Clone has greatly simplified the customary method of controlling process dust. Since the functions of exhausting, separating and storing the dust are performed in a single unit, only piping and hoods are required to complete a Roto-Clone dust control system. The compact design of the Roto-Clone permits it to be located near the source of the dust; allows dust producing operations to be placed at the most advantageous location in the production line, and has made it possible to work out new systems of dust control that have the advantages of greater simplicity, increased efficiency, extreme compactness and lower operating cost.

AMERICAN AIR FILTER COMPANY, INC.
Incorporated
361 Central Ave. Louisville 8, Kentucky
***In Canada:* Darling Bros. Ltd., Montreal, P. Q.**

AAF **ROTO-CLONE**
FOR PROCESS DUST CONTROL
ROTO-CLONE IS A REGISTERED TRADEMARK FOR A DYNAMIC PRECIPITATOR OR HYDROSTATIC BAFFLE TYPE WET COLLECTOR

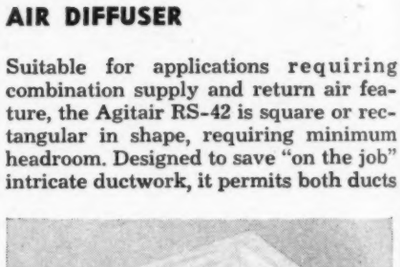
by red and black plastic pushbuttons. The shaft passes through a plastic shorting bar, on which are mounted two silvered plates, making or breaking the power supply at four fixed silvered contacts. Switch has plastic housing in which space is provided for strain relief washers, a neon lamp, and a power resistor (connected only in "on" position). The glow lamp serves as a visual indicator that the power is on. Trilmont Products Co., Walnut St. at 24th, Philadelphia 3.

GRINDING WHEEL WASHERS

Built to prevent broken segments of a grinding wheel from leaving the shaft, safety washers consist of 20-gage steel disks on which a surface of compounded rubber is vulcanized. One washer is applied to each side of the grinding wheel. When pressure of the outside steel flanges is applied, the rubber is forced into the porous surface of the wheel, holding it in place. In this manner the stress in the wheel from centrifugal force is transferred to the washer, which in conjunction with the shaft carries the load. For all flanges up to 30 inches in diameter. Industrial Products Co., 2820 North 4th St., Philadelphia 33.

AIR DIFFUSER

Suitable for applications requiring combination supply and return air feature, the Agitair RS-42 is square or rectangular in shape, requiring minimum headroom. Designed to save "on the job" intricate ductwork, it permits both ducts



to run on same plane with separate connections for both supply and return air. Eliminates special cutting and sealing to prevent supply air leakage. Available in a variety of sizes and patterns with complete diffusion control. Air Devices, Inc., 17 East 42nd St., New York 17.

MULTIPLE CONTACT CONNECTOR

Adapted to limited space applications where plug-in operation is required, rectangular monoblock connector can be supplied with a self-contained locking device, eliminating need for external clamping arrangement. Molded of Melamine plastic, the one-piece inserts reduce the danger of flash-over from moisture and dust accumulations. Two guide pins, acting as ground contacts,

BUNELL

Announces

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IMMEDIATELY EFFECTIVE, The Bunell Machine and Tool Co. offers a new Outside-Plant-Engineering Service for industry. This is in addition to its tool, die and special machine engineering, designing and building services at its plant and is on the same charge basis as these regular services.

THE COMPANY WILL ANALYZE and review equipment and processes in individual plants, to determine solution to problems. Trained observers—Bunell technicians who are experienced in "how to do it" techniques—make the necessary check of procedures and machines.

THE IMPORTANCE OF THIS Bunell plant service is apparent. There is a direct analogy between the periodic physical check-up of the individual to determine the state of his health and the seasonable factory check-up to determine the status of operations and methods.

It is not a substitute for the services offered by management engineering firms. It is used by both industry and management consultants.

IT IS AN INSURANCE SERVICE to safeguard against expensive mistakes—to get rid of unnecessary complexities in the manufacturing operation. It's a readily available service of simplification—a "man Friday" service of expert help.

Whether the program wanted is complete or only a departmental survey, it is relatively inexpensive—a test of every probability for profitable improvement. Ask about it.

THE BUNELL MACHINE & TOOL COMPANY

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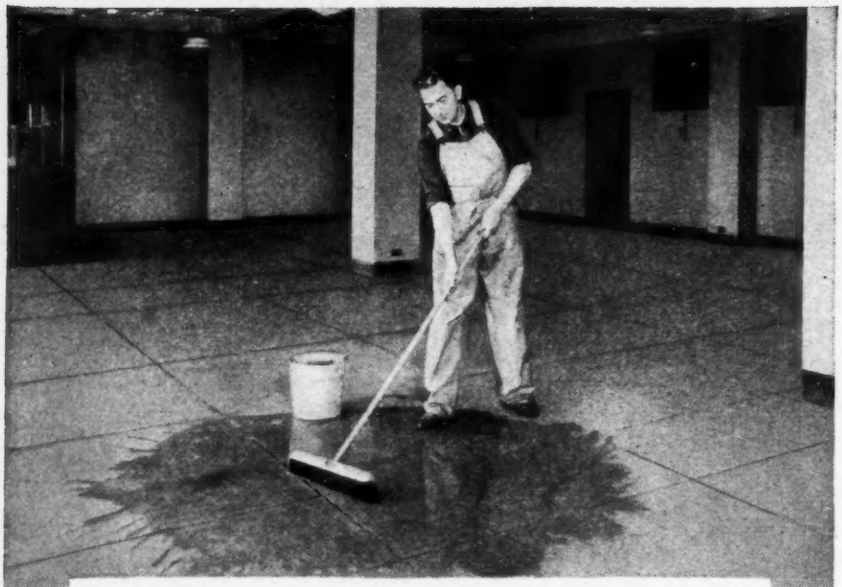

No, he's not washing the floor . . .
he's *hardening* it with

LAPIDOLITH

to save it from concrete dusting and disintegration

LAPIDOLITH *Liquid* (patented) thoroughly hardens concrete floors for heavy-duty service without interrupting work schedules . . . saves the cost and inconvenience of patching and retopping.

10 TIMES HARDER

LAPIDOLITH penetrates quickly and deeply, reacting with the lime in the cement to form a close-grained, granite-like surface 10 times harder than untreated concrete. Dusting is eliminated; danger from alternate freezing and thawing minimized; floor protected against action of oils and many chemicals. Excellent for terrazzo floors, too.

EASY TO APPLY

Lapidolizing is just as easy as washing a floor. The first treatment is the only treatment—the first cost is the only cost. In fact, the results gained with LAPIDOLITH cost less than any other known method of dustproofing and wearproofing floors!

More facts in SWEET'S, or write Dept. F-10, for illustrated brochure packed with floor-saving information.

You can do this to many untreated concrete floors, but not to a Lapidolized floor!

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Floor Treatments • Waxes • Paints and Protective Coatings • Concrete and Mortar Admixtures • Waterproofing and Dampproofing • Caulking Compounds Roof Coatings

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Building Products Division, **L. SONNEBORN SONS, INC.,** New York 16, N. Y.
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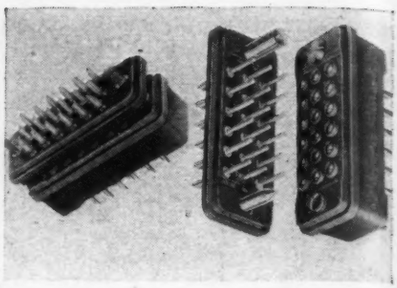
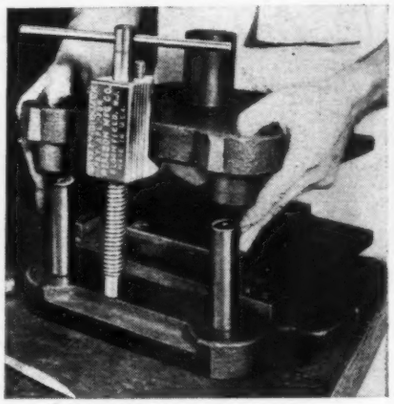


provide for alignment and polarization. The multiple telescoping barriers that serve to isolate contacts increase surface creepage and air gap between adjacent contacts, permitting use at high potentials. Made in two sizes—18 contacts (RE18S) and 12 contacts (RE12S), connector can be fitted with straight type contacts (RE18 and RE12). The Winchester Co., 6 East 46th St., New York 17.

SAFETY DIE JACK

Separating die sets with die jack is said to prevent injury to operators, as well as possible damage to dies and punches. Applied to the punch holder in a few seconds, the jack enables a single opera-



tor to elevate or lower the tool to any height required. The clamp block is one-piece, heat-treated aluminum alloy capable of withstanding heavy loads, according to the manufacturer, and fits easily into a toolbox. Persson Mfg. Co., 2 Henry St., Bloomfield, N. J.

MILL MOTORS

Line of d.c. armored mill motors, Type MD-600, features increased horsepower in smaller space, in ratings from 5 to 200 horsepower. Has solid roller bearings, close-coupled. Adaptability of the frame to different enclosures allows change-over among protected, totally enclosed, or separately ventilated types. The AISE ratings for horsepower, speed, temperature, and mounting dimensions are maintained, but the next larger rating is obtainable in the present frame size. Reduction in size per horsepower is accomplished by maximum utilization of space in the machine, particularly around bearing heads, and the use of glass insulation. Among the features claimed

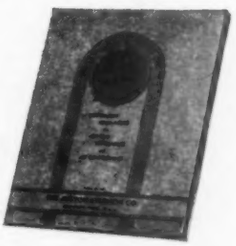
Neat, compact, reliable. Self-powered and self-contained. Uses Sylphon bellows thermostat assembly.

Sylphon Regulators available with Dial Indicating Thermometer

Pictured above is Fulton Sylphon's No. 923-T Temperature Regulator. Long well and favorably known for its dependable performance in the control of liquid temperature . . . rugged No. 923 regulator has recently been further improved through the addition of a dial indicating thermometer.

The thermometer indicates the temperature being maintained at the regulator bulb... obviates the necessity of installing a separate thermometer adjacent to bulb. Adjustments can be made easier, quicker, and more accurately.

Also available on Sylphon Regulators Nos. 921, 921-Q, and 923-Q. For complete information, write for your copy of Catalog TF-20 today.

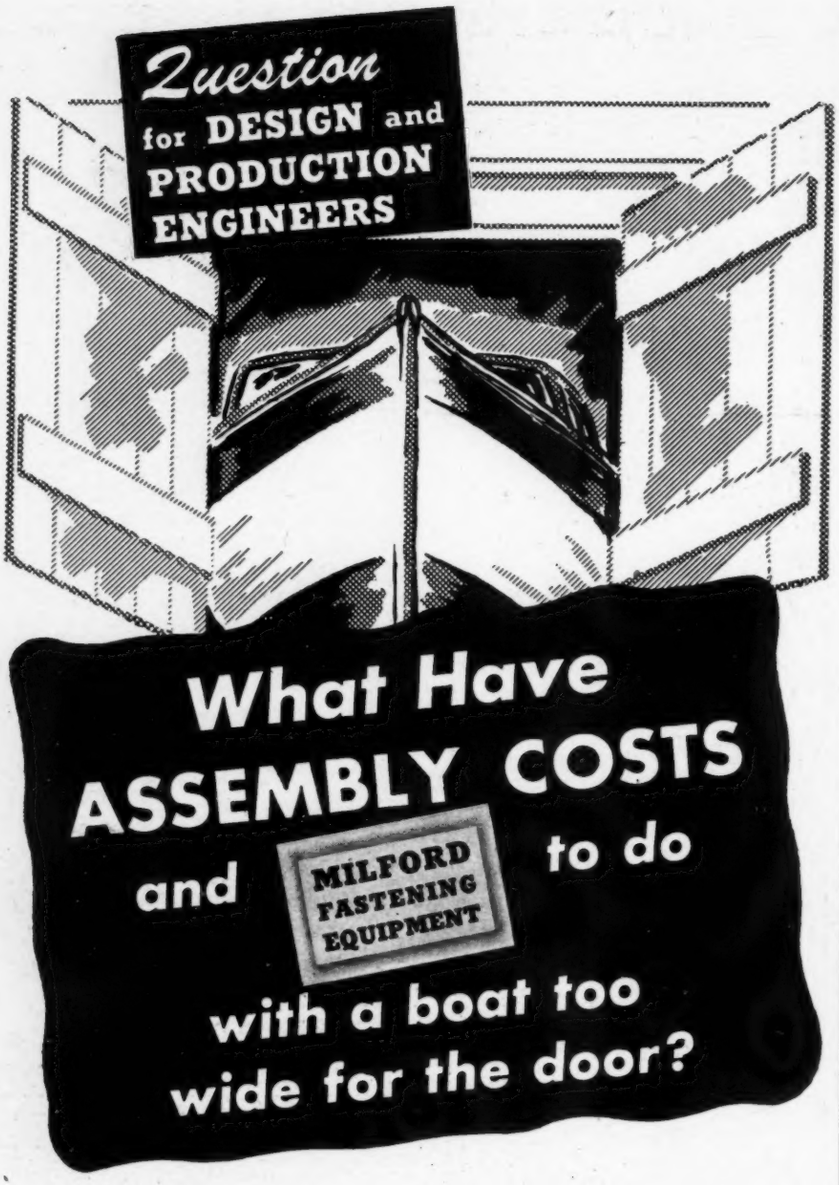


Handsomely illustrated catalog, prepared specifically for your industry, describes No. 923-T and other temperature regulators.

THE FULTON SYLPHON CO. KNOXVILLE 4, TENN.

FULTON SYLPHON

Temperature Controls · Bellows · Bellows Assemblies



It happens regularly: the boat built in the basement that costs a fortune to get out..

A parallel situation is an assembly, perfectly planned on the drawing board, that requires off-standard fasteners and specially tooled machines —at thousands of dollars extra cost.

A fraction of an inch difference in the size or location of the holes —and Milford standard rivets and rivet-setting machines could have been used; thousands of dollars saved; assembly operations speeded up; profits increased.

The short-cut to such goals is consultation with a Milford engineer EVEN BEFORE AN ASSEMBLY DESIGN REACHES THE DRAWING BOARD.

Milford engineers welcome such exploratory discussions. Their knowledge and experience in the intricate field of fastenings is vast. Call upon them freely—in confidence and without obligation.

THE MILFORD RIVET & MACHINE CO.

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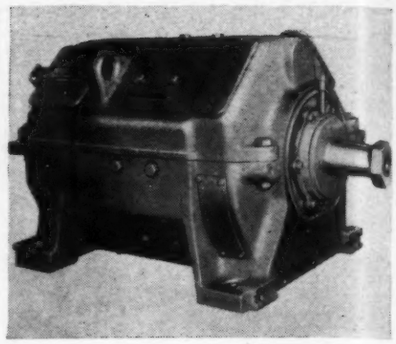
Inquiries may also be addressed to our subsidiary:

THE PENN RIVET & MACHINE CO., PHILADELPHIA 33, PENNA.

Designers and Manufacturers of: SPECIAL COLD-HEADED PARTS; SPLIT, SEMI-TUBULAR AND DEEP-DRILLED RIVETS; RIVET-SETTING MACHINES; SPECIAL MACHINE SCREWS AND SCREW MACHINE PARTS.



are redesigned internal ventilation system, increased overload capacity, silicone resin varnish binder for mica on armature coils, and commutation sparkless beyond 200 percent load. Motor Div., General Electric Co., Schenectady 5.

PANEL TACHOMETER

Electric tachometer is designed for use where the pick-up unit or generator must be mounted permanently on a machine, and the meter mounted on a panel removed from the generator position. Generator consists of a small, permanent Alnico magnet rotor mounted on sealed ball bearings, and capable of continuous operation at any speed within the limit of the meter. Meter, or indicating instrument, is a rectifier type, including a D'Arsonval movement. It is built to withstand a momentary overload up to four times the maximum speed indication without damage. For installation up to 200 feet, the unit may be connected with two-conductor No. 18 insulated wire, and conductor for longer distances can be designated. The meters are rectangular in shape, in 3- and 7-in. sizes, and both are made in three scale sizes: 0-1250, 0-2500, and 0-5000 r.p.m. Ideal Industries, Inc., 1416 Park Ave., Sycamore, Ill.

VAPOR STEAM CLEANER

Production, road, construction machinery; truck bodies and engines; walls, windows, tanks, and vats can be cleaned with Model MO-46B vapor steam cleaner, which also strips paint. Machine is made either as a stationary unit with base, a movable unit with casters, or as a

The Company that bought a YCILOP!

by Mr. Friendly

Any accident looking for a place to happen, always chose the Winkle Works! Life was nothing but accidents and low production, when Mr. Friendly suggested a *Ycilop.* "A what?" said Mr. Winkle, the president.

"A Ycilop," said Mr. Friendly. "It's a part watch dog, part guardian angel, with a mixture of cash register!"

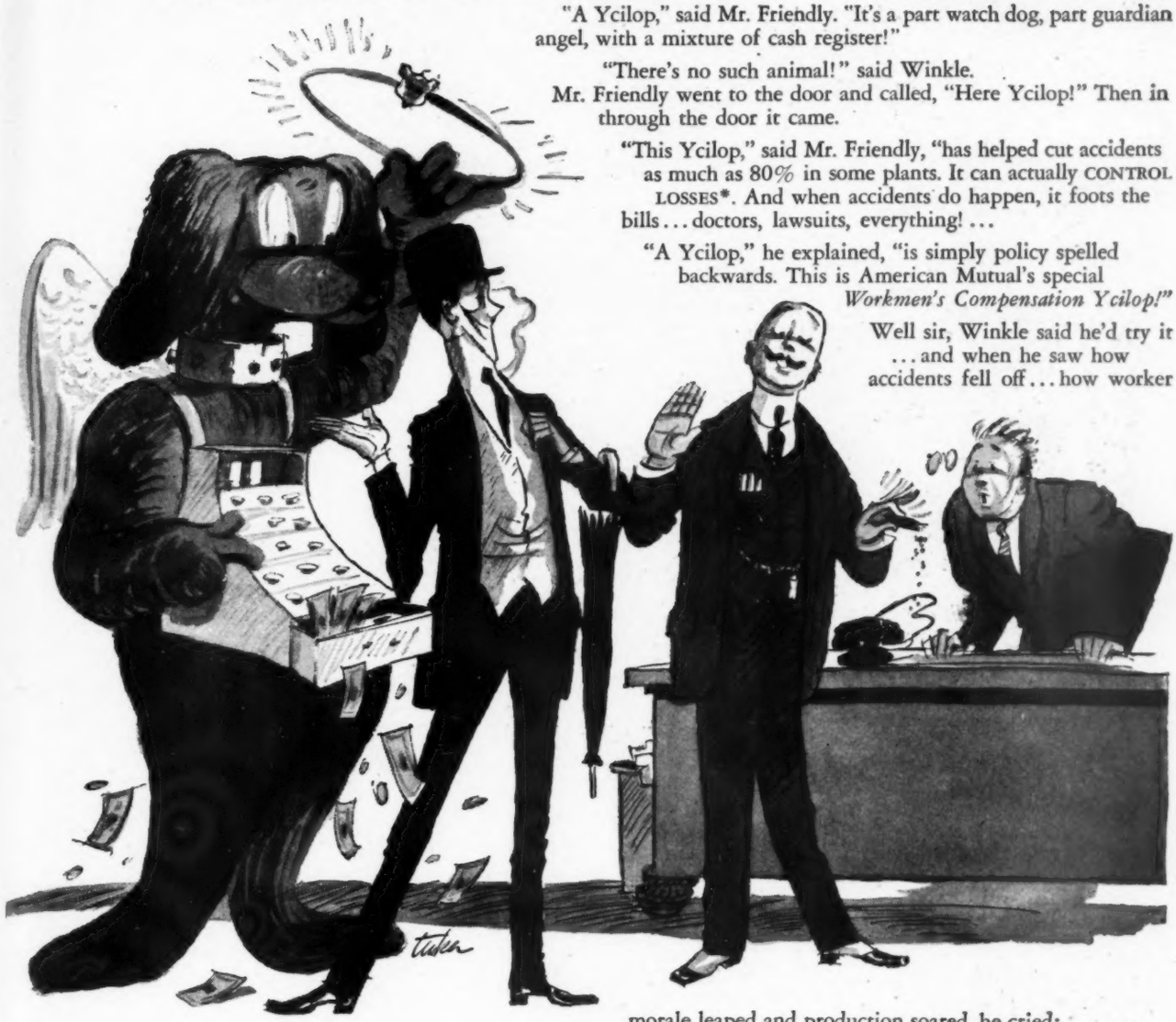
"There's no such animal!" said Winkle.

Mr. Friendly went to the door and called, "Here Ycilop!" Then in through the door it came.

"This Ycilop," said Mr. Friendly, "has helped cut accidents as much as 80% in some plants. It can actually CONTROL LOSSES*. And when accidents do happen, it foots the bills... doctors, lawsuits, everything! ...

"A Ycilop," he explained, "is simply policy spelled backwards. This is American Mutual's special *Workmen's Compensation Ycilop!*"

Well sir, Winkle said he'd try it ... and when he saw how accidents fell off... how worker morale leaped and production soared, he cried: "Thanks to that Ycilop, we're as yppah a company as you'll find anywhere... and yppah is really *happy!*"



Your helping hand when trouble comes!

A M

Provided with every Ycilop! ... American Mutual's I. E. LOSS CONTROL* service... a special service that helps reduce manufacturing costs... boost profits... improve employee morale. Write for full details. American Mutual Liability Insurance Company, Dept. F-1 142 Berkeley Street, Boston 16, Mass.

** Accident prevention based on principles of industrial engineering.*

AMERICAN MUTUAL... *the first American liability insurance company*

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"Is dis de plant where de employees is kept aloit and refreshed by G-E Water Coolers?"

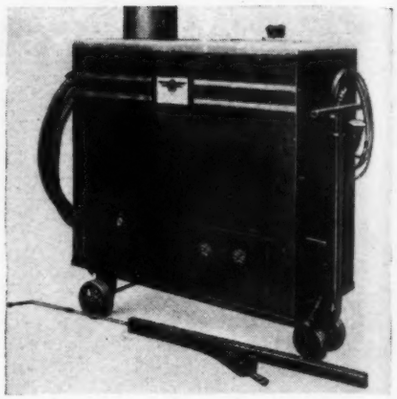
How to solve a tough employee problem

HERE'S ONE WAY to keep employee morale soaring. Just install a G-E Water Cooler and watch the smiles light up. There's real refreshment in the cool, pure water a G-E Water Cooler provides.

It costs so little to operate a G. E. : : : an approximate average of *only 2¢ a day!* The sturdy cooling unit is powered by a quiet, reliable G-E motor. The reservoir is rust-proof stainless steel. And every cooler is backed by a G-E warranty.

Your G-E dealer will make deliveries as fast as production allows. Call him today. He's listed under "Water Coolers" in the Classified Directory. *General Electric Company, Air Conditioning Department, Section 67210, Bloomfield, New Jersey.*

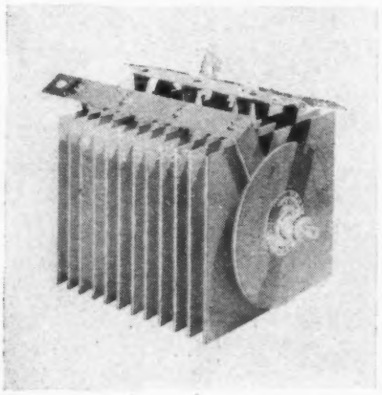
GENERAL ELECTRIC
Water Coolers



trailer-carried unit. Two accessible valves enable one man to operate the machine, and pressure, once set, is automatically controlled during the cleaning operation. Electric ignition is said to eliminate waiting for unit to warm up, or need for pre-heating. Operating pressures are 75 to 125 p.s.i., normal pressure is 100 pounds. Unit is equipped with lightweight cleaning gun and 25 feet of oil-resistant steam hose. White Engineering & Mfg. Co., 102 West Passaic St., Rochelle Park, N. J.

SELENIUM RECTIFIER PLATES

Applicable for electroplating and battery charging, 5x5¾-in. selenium rectifier plates for high current capacity are built on aluminum. Said to feature long life and minimum weight with maximum

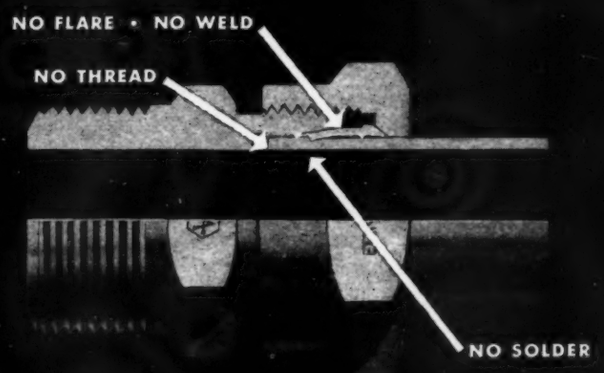


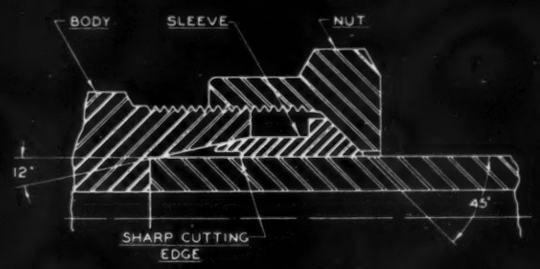
heat dissipating value, the stacks when arranged in suitable combinations of series or parallel plates are compact. Radio Receptor Co., Inc., 251 West 19th St., New York 11.

DIAPHRAGM VALVES

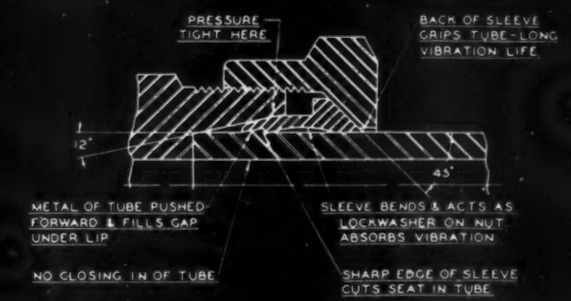
Kontrol Motor valves for pressure regulators, pump governors, and diaphragm motor control valves, feature lightweight, all-steel diaphragm motor. Diaphragm casings are boltless, assembled with clamp rings, and diaphragms are molded reinforced neoprene. Manufacturer states that large effective diaphragm areas combined with heavy, fully enclosed, heat-treated springs provide maximum power. Valve position in-

No Other Fitting has this





Tube Inserted in Fitting — Nut and Sleeve Snug


PRESSURE TIGHT HERE
BACK OF SLEEVE GRIPS TUBE-LONG VIBRATION LIFE
12°
45°
METAL OF TUBE PUSHED FORWARD & FILLS GAP UNDER LIP
SLEEVE BENDS & ACTS AS LOCKWASHER ON NUT ABSORBS VIBRATION
NO CLOSING IN OF TUBE
SHARP EDGE OF SLEEVE CUTS SEAT IN TUBE

Nut Tightened In Place

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MORE and more Contractors and Manufacturers are learning *to their profit*, the benefits of Weatherhead Ermeto Fittings. They solve the mechanical problem of connecting tubing without the necessity of flaring, threading, welding or soldering. This is truly a time-saving fitting.

Connections are quickly made which will, in most instances, hold beyond the burst strength of the tube itself and withstand excessive vibration without loosening the joint.

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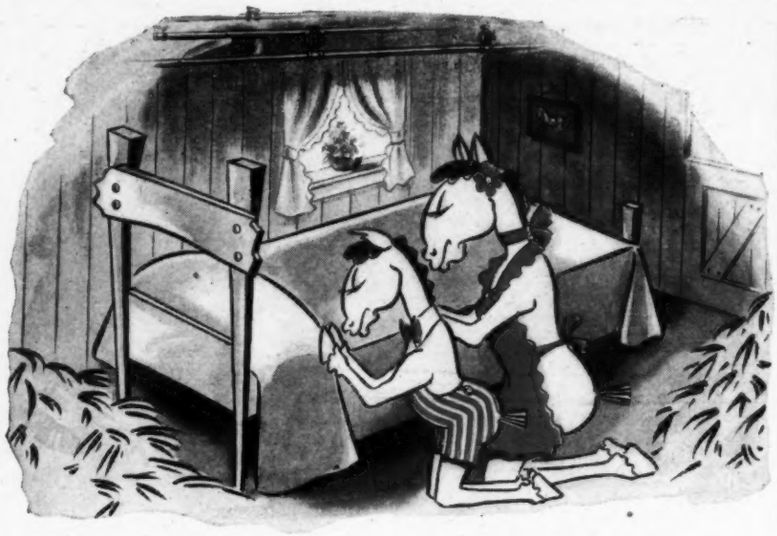

We kneel dear Lord in silent prayer,
Ever mindful of Thy guiding care.
We thank Thee Lord as best we're able,
For the "Automatic" Sprinklers
protecting our stable.

Maybe our ode should be entitled "The Horses Entreat" or "The Plugs Plug for "Automatic" Sprinklers."

Definitely certain, however, is the need for proper "fool-proof" fire protection, not only for racing stables, pavilions and the like, but for nearly every type of business establishment.

The tried and proven method of fire protection is the automatic sprinkler.

The tried, proven and entirely "fool-proof" fire protection system is Suprotex*—Rate-of-Rise, the completely "Automatic" System that prevents damage by fire—and water. *It sees and shouts before it fights.*

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IT BLANKETS • IT ISOLATES • IT QUENCHES

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"Automatic" Sprinkler

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

YOUNGSTOWN, OHIO . . . . . OFFICES IN 37 CITIES

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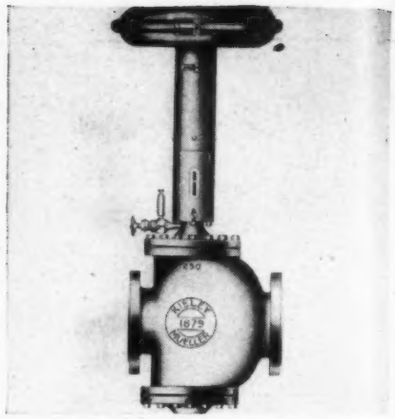
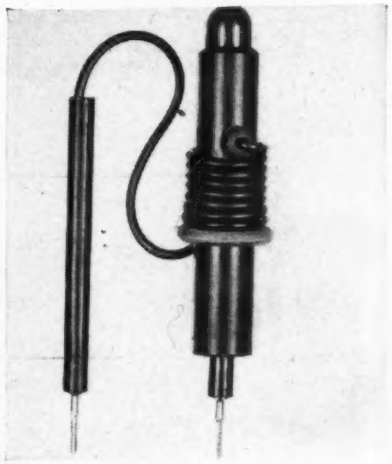


dicators are furnished as standard. Valve bodies are of high capacity, with unrestricted flow areas. Available in bronze, semi-steel, cast steel, and special alloys. Disks are top and bottom guided, and guide surfaces are ground and finished to provide minimum friction. Kieley & Mueller, Inc., 2013 43rd Street, North Bergen, N. J.

TEST LAMP-VOLTAGE INDICATOR

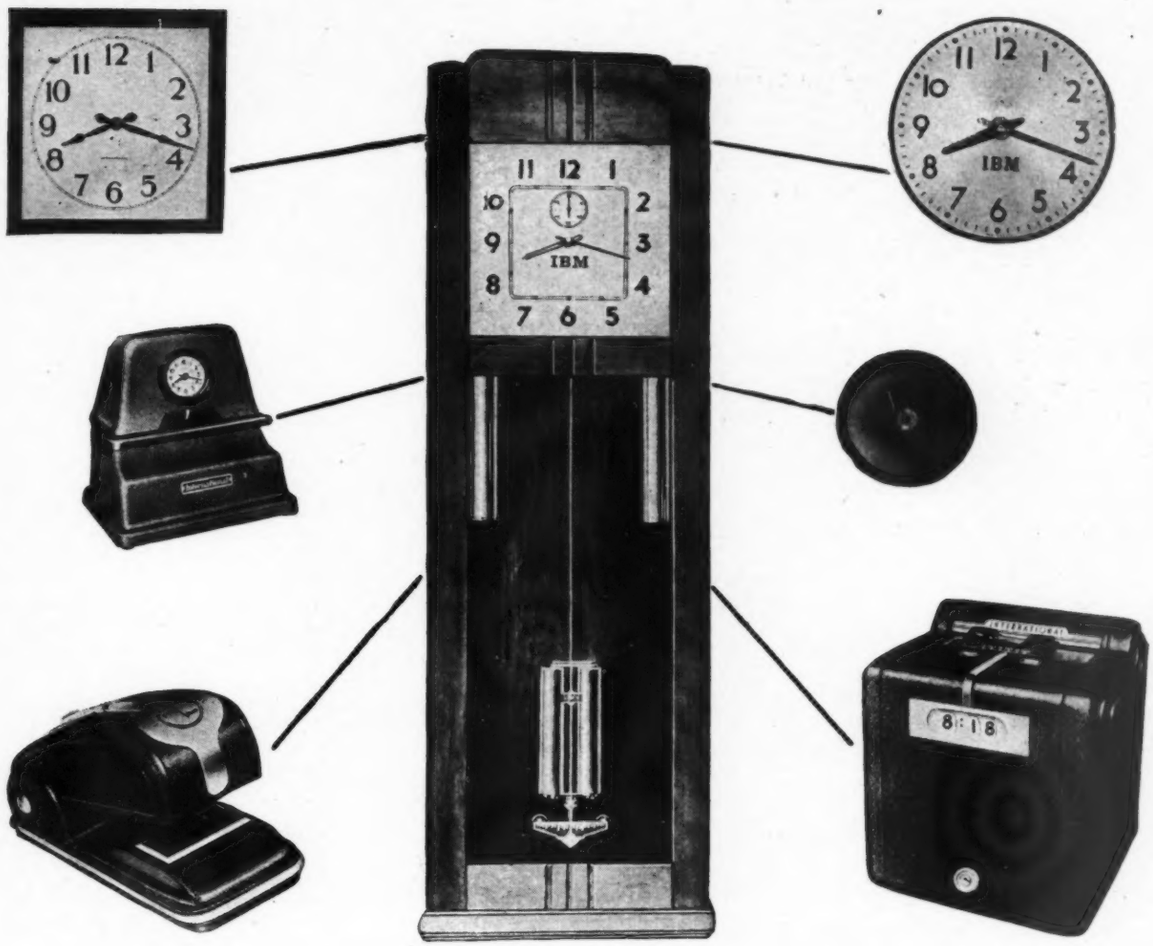
The "Hi" safety test lamp and voltage indicator is for use on a.c. or d.c. circuits to locate grounds, opens, blown fuses, motors running single phase, tracing control and other circuits, and to indicate



approximate voltage. It is equipped with a filament lamp, and has one test lead, which prevents shorting out the resistor. Gives definite signals in lighted as well as in dark places. No fuses required for safety. Both the lamp and test lead can be renewed. Made in two models, 100 to 600 volts. Holub Industries, Inc., Sycamore, Ill.

PIPE JOINT

Anchor Joint combines rigid anchoring of piping at accessible points, with allowance for unequal thermal expansion and contraction on either side of the anchor point. This is accomplished by varying the number of bellows flanges on either



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throughout your entire plant

Every department, every office, every building operates on the same accurate time when it is equipped with the IBM Self-Regulating Electric Time Indicating System.

An IBM Master Time Control "manages" your entire timing operation with split-second accuracy, checks each secondary clock once each hour and coordinates it with the Master.

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OUT OUR WAY

THAT'S "WAITIN' FOR TH' ROBERT E. LEE" AS PLAIN AS YOU EVER HEARD IT-- THEM BOILER-MAKERS ARE CLEVER!
WONDER WHY SOME VAUDEVILLE OUTFIT DON'T GRAB UP THEM GUYS!
YEH, BUT IF IT WASN'T FOR SOL-SPEEDI-DRI, THEY WOULDN'T BE ABLE TO DO IT. LET 'EM TRY TO CUT A STEP ON GREASY FLOORS WITHOUT SOL-SPEEDI-DRI -- THEY'D BREAK THEIR NECKS!
BOILERMAKERS' BOOGIE
J. R. WILLIAMS
T. M. REG. U. S. PAT. OFF.
COPR. 1946 BY NEA SERVICE, INC.

SOL-SPEEDI-DRI CURES SICK, SLICK FLOORS

Just spread SOL-SPEEDI-DRI around . . . and immediately, you've got a carpet of safety underfoot . . . safe for walking . . . safe for working. Sweep up this white, granular oil- and grease-absorbent . . . and your floors are whistle-clean!

There's nothing complicated about SOL-SPEEDI-DRI. No machinery . . . no trained personnel . . . is required for its use. One man to spread it on . . . the same man to sweep it up. That's all. SOL-SPEEDI-DRI soaks-up oil- and grease-deposits as a blotter soaks-up ink. In time, SOL-SPEEDI-DRI will clean up even ancient oil- and grease-deposits.

What's more . . . SOL-SPEEDI-DRI reduces the danger of flash-fires over oil-steeped floors. SOL-SPEEDI-DRI will not readily burn, even when completely oil-soaked!

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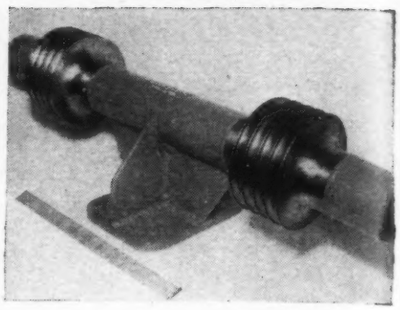
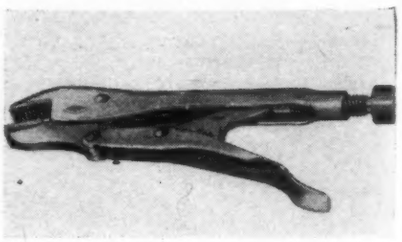
OIL AND GREASE ABSORBENT



side of the anchor base to accommodate each condition encountered. Where severe hydraulic surges within piping occur, the joints minimize the transmission of shock to fittings and adjacent structures. Made of stainless steel, monel, inconel, and copper, for standard pipe sizes from ½ to 24 inches. The expansion flanges are supplied from any one of the standard 25-, 55-, 150-, 400-, or 1000-lb. series, for pressures from vacuum to 1000 p.s.i. Temperatures handled range from 300 to 1600 deg. F. Standard fittings can be incorporated in the joints, and welding ends are supplied, with pipe flanges and inner linings optional. MagniLastic Div., Cook Electric Company, 2700 North Southport Ave., Chicago 14.

LOCK WRENCH

Locking hand wrench is said to have gripping strength equivalent to 1-ton pressure. Double lever or toggle action permits it to be used as a combination straight, end, or pipe wrench, vise, toggle press, clamp, or pliers. Parts up to any size that fit the maximum jaw opening

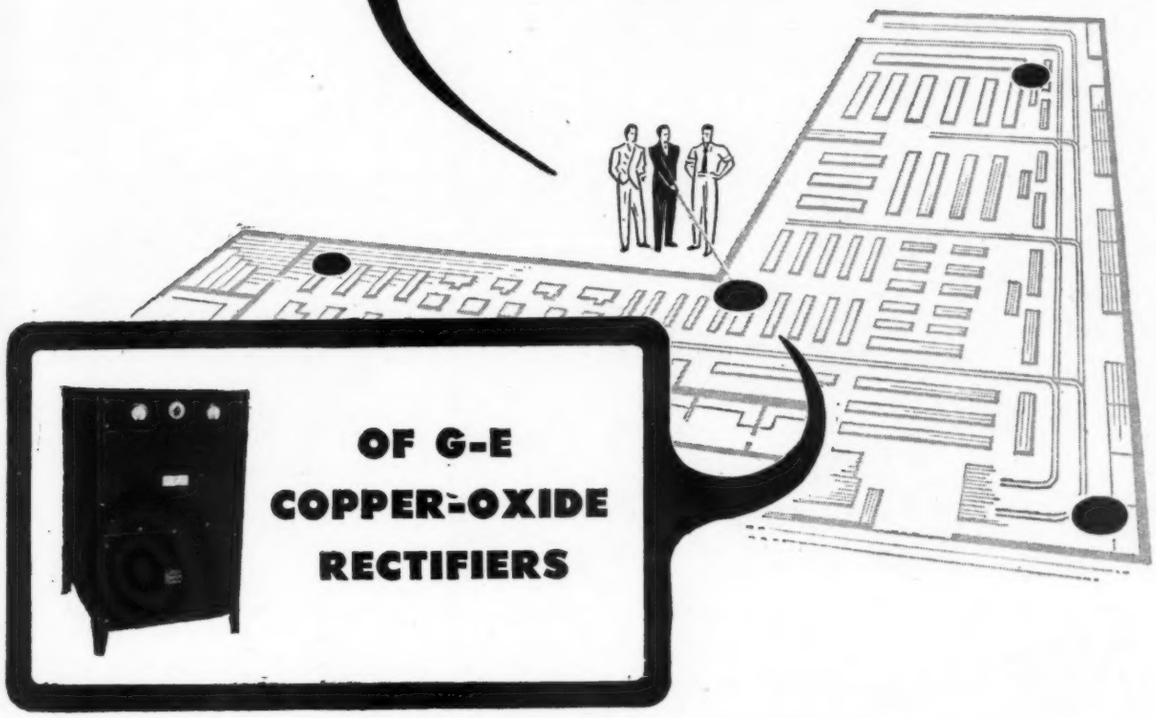


of 1¼ inches can be held by the wrench for tooling, drilling, grinding, or machining, without slipping or changing position. Made of alloy steel and cadmium plated, wrench is 10 inches long. A. C. E. Inc., Transportation Bldg., Detroit 26.

REGULATING VALVES

Single-seated, balanced diaphragm regulating valves for process industries and power plants are made with cast-iron, bronze, and steel bodies for steam, air, or gas pressures up to 1000 p.s.i. Designed to be actuated by standard pressure or temperature instruments or controllers using 20 p.s.i. air or clean water. Supplied as standard equipment with 800 Brinell hardened stainless steel main valves and stellited seat rings, the valves are engineered to provide equal

"Strategic Spotting!"



OF G-E COPPER-OXIDE RECTIFIERS

helps keep materials moving!

By charging electric truck batteries right in the areas where they work, you gain time for *more* work and handling. Why lose good time routing tired trucks to an inconveniently located battery room?

Locate G-E copper-oxide battery rectifiers in the plant or warehouse, in heavy traffic areas where they are always ready for use. When a hand truck battery needs a lift, it's a simple operation for the driver. He sets the control, and the charger takes over to finish the job, cutting out when charge is complete. No danger of overcharging, power and costs are reduced.

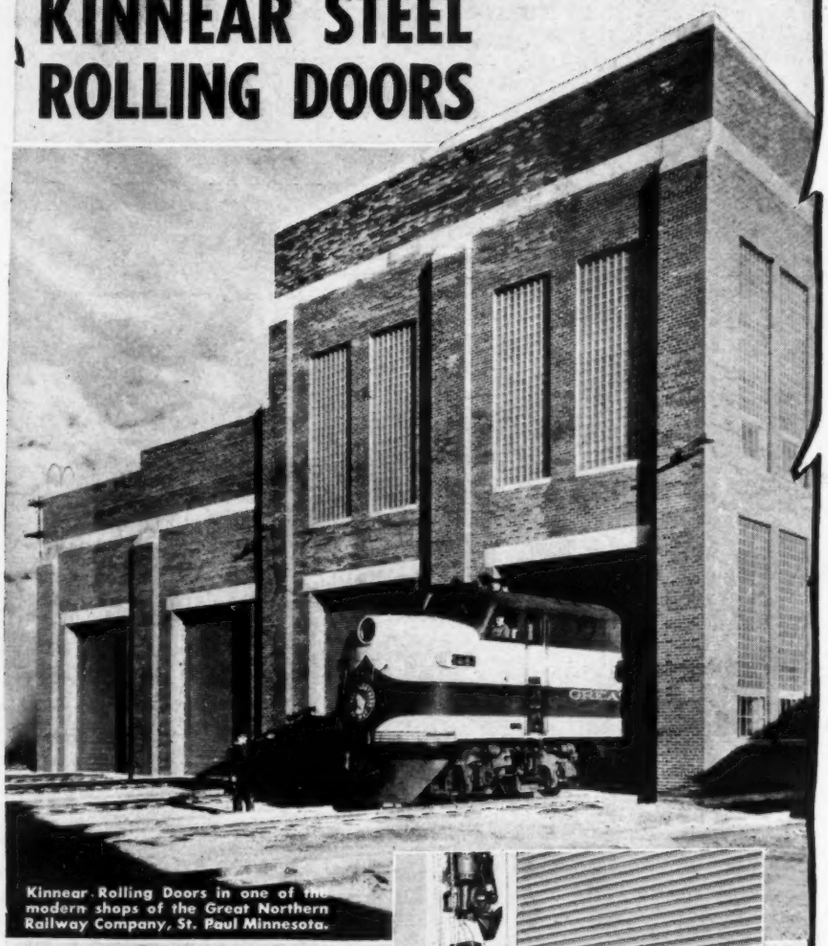
This "Strategic Spotting" of G-E rectifiers, locally, permits a useful noon-hour boost to keep your trucks up to par. G-E copper-oxide chargers for lead-acid batteries, for nickel-alkaline batteries, and for combination use are priced low, and are made in capacities to meet your battery needs. For illustrated booklet and complete information, write Section A27-1037, Appliance and Merchandise Dept., General Electric Company, Bridgeport 2, Connecticut.

GENERAL ELECTRIC

A27-9137

Where modern speed and efficiency are *most* important, you'll find

KINNEAR STEEL ROLLING DOORS



Kinnear Rolling Doors in one of the modern shops of the Great Northern Railway Company, St. Paul Minnesota.

You keep doorways in step with modern transportation's increasing demands for *time-saving efficiency* and *low maintenance* when you install Kinnear Rolling Doors. They combine all the space-saving advantages of *coiling upward action* with the protective strength of *all-metal construction.*

The smooth, easy action of Kinnear's famous interlocking-slat curtain speeds door traffic. The entire door coils quickly out of the way *above* the opening. All surrounding floor and wall space is fully usable at all times. The opened door is always completely safe from damage by wind or vehicles. Its rugged metal construction defies wind, storms and intruders . . . resists fire . . . stands up under years of punishing use. And with Kinnear Rolling Doors, you get *maximum* benefits from the motorized, push-button operation (with remote control stations if desired) offered by Kinnear Motor Operators. Write for complete data on Kinnear Rolling Doors — today!

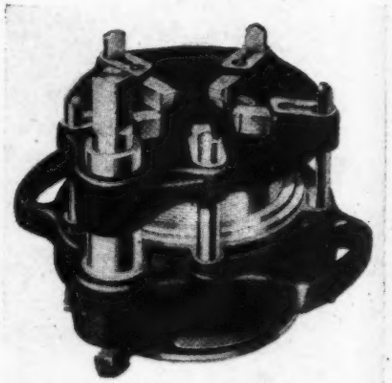
KINNEAR ROLLING DOORS

THE KINNEAR MANUFACTURING CO.
Factories: 1540-60 Fields Ave., Columbus 16, O.
1742 Yosemite Ave., San Francisco 24, California

capacity to double-seated regulating valves of the same size, and to be tight in dead-end service, eliminating leakage of fluid when in closed position. For temperatures over 450 deg. F., steel diaphragm valves are equipped with a Conden-Seal cooling bonnet, and a reservoir of condensate. Leslie Co., 112 Delafield Ave., Lyndhurst, N. J.

PIPE THREADER

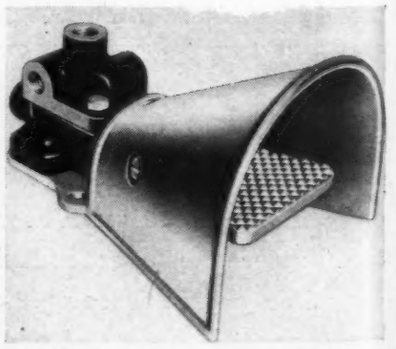
Quick-setting workholder and balanced loop handles are featured in Type 4P geared pipe threader. The workholder enables a worker to set the threader exactly to size before placing it on the pipe; once installed only one screw needs to be tightened to hold it in place. Bushings have been eliminated. Loop handles on the enclosed gear case prevent slipping or tipping over, facilitate



picking up and straightening on the pipe, as well as carrying with one hand. Twin-anchored drive shaft turns in oilless bronze bearings. Gear is fully enclosed, packed in grease, protected from dirt and wear. Made of steel-and-malleable, the unit is provided with four sets of five high-speed steel dies to cut standard or tapered threads, drip threads, and short nipples. Ratchet handle is supplied, and a Ridgid design universal drive shaft is available. Ridge Tool Co., Elyria, Ohio.

COMPRESSED-AIR VALVE

Universal type of foot-operated valve can be used to control any type of air cylinder. Applies pressure with the pedal depressed, or, by a rearrangement of piping, can apply pressure with the



pedal released. Measures 7⅛x5½x4¼ inches. Operating pedal of the valve is shielded to prevent accidental operation. The shield is painted orange for visibility. Manufacturer states that pedal cannot stick in the downward position, because it is returned to upward position by the operating air pressure in valve. National Pneumatic Co., Rahway, N. J.

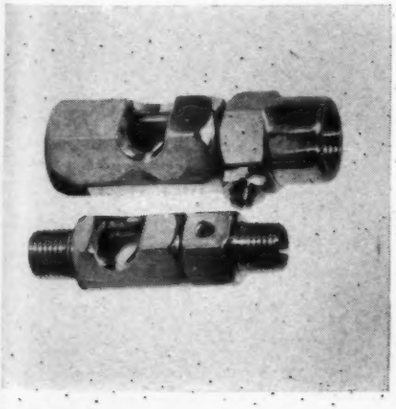
COMBINATION STARTERS

Hi-Fuse polarized field frequency synchronous motor controls with current-limiting fuses are suitable for general installation in industrial plants with high voltage service. Applicable without necessity for engineering analysis of short-circuit currents, and provide interrupting capacity generally adequate for all except the largest distribution

systems, according to the manufacturer. Control provides disconnecting means, short-circuit protection, and motor overload protection. Furnished in ratings up to 5000 volts, with a current interrupting capacity of 60,000 amperes asymmetrical. Enclosures available: NEMA types 1, 1-A, 5. Electric Machinery Mfg. Co., Minneapolis.

SIGHT FEED VALVE

Adapted to circulating oil systems, or multiple oiler arrangements for feeding a number of bearings from a central reservoir, valves show rate of flow for visual checking. Flow through the port can be adjusted by a combination of a setscrew and a hollow lockscrew located



Rely On ROSS handle materials in BIG LOADS . . . reduce HANDLING COSTS

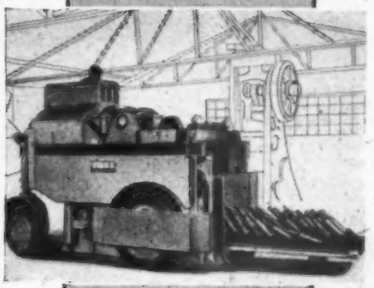
It's axiomatic that the more pieces or pounds handled in a single load, the lower the handling-cost per individual piece or pound . . . Designed and built to transport and stack *heavy unit-loads*, ROSS Straddle Carriers and ROSS Heavy Duty Lift Trucks are renowned for their ability to effect big savings in cost of handling a great variety of raw materials, semi-finished and finished products.

ROSS engineers will be glad to suggest practical solutions to materials-handling problems in your plant. For complete description of The ROSS System, write for colorful forty-page ROSS Book F-106

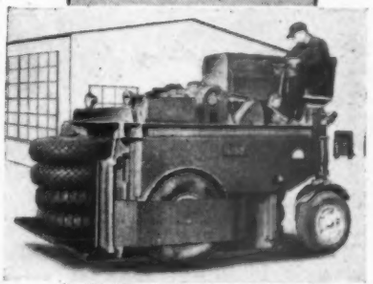
The ROSS *System*
of STRADDLE CARRIERS and LIFT TRUCKS
- CAPACITIES -
Series 90 Straddle Carrier — 20,000 to 30,000 lbs.
Series 70 Straddle Carrier — 10,000 lbs.
Heavy Duty Lift Trucks — 6,000 to 18,000 lbs.

RECEIVING

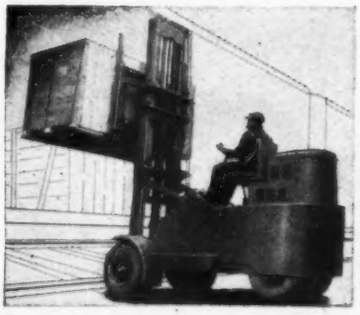
PROCESSING



STORAGE

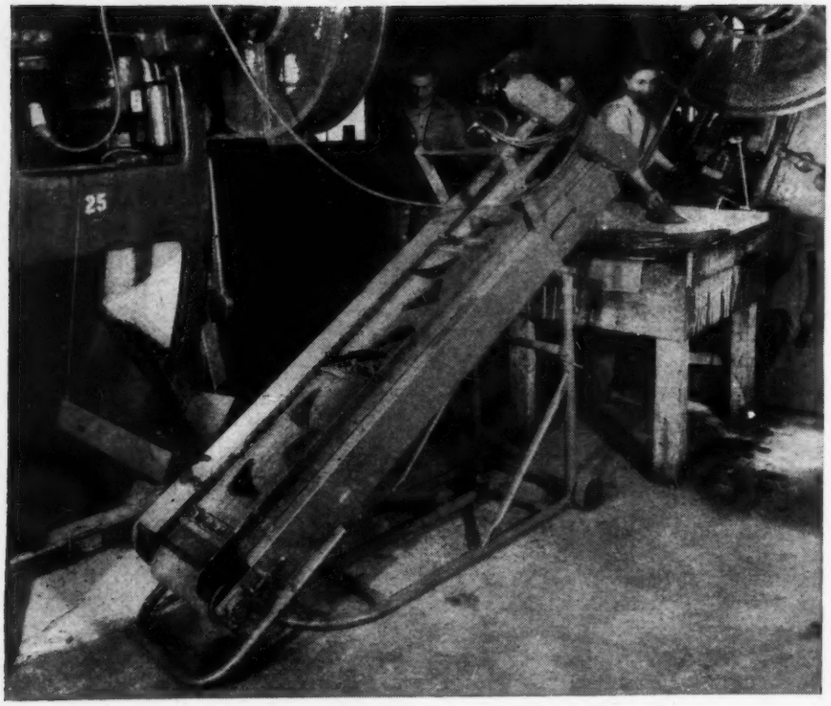


SHIPPING



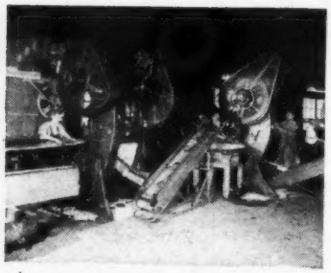
The ROSS CARRIER COMPANY • 300 Miller Street, Benton Harbor, Michigan, U. S. A.
Direct Factory Branches and Distributors Throughout the United States and Canada

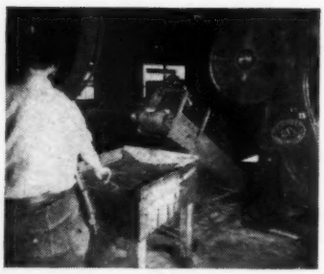
ROSS
HEAVY DUTY MATERIALS-HANDLING EQUIPMENT



BETWEEN MACHINES **PRODUCTION FLOW-WAY**

THE RAPIDS-STANDARD *Press-Veyor*





Keep small parts flowing steadily between machines . . . eliminate stock handling men . . . reduce worker fatigue . . . efficiently mechanize your entire production line . . . with the **Rapids-Standard Press-Veyor.**

Readily portable, the Press-Veyor is a power driven, endless belt conveyor that can be used anywhere in the plant. Where small parts and scrap are otherwise carried by hand, the **Press-Veyor** "Production Flow-Way" reduces accident hazard through better shop housecleaning . . . carries production along smoothly. Fatiguing, time-consuming, "shovel and lift" methods are eliminated.

Rugged in construction, the **Press-Veyor** is built of heavy gauge steel, to withstand the hard abuse of stamping room operations. It is adjustable at both delivery and receiving ends . . . built in 6′ and 8′ models to meet a wide range of operating conditions.

For more details on stepping up production in your small parts operations, write today for the new Press-Veyor Bulletin.

OFFICES IN PRINCIPAL CITIES

Manufacturers of

STEEL FORGED CASTERS · TRUCKS · CONVEYORS · POWER BOOSTERS

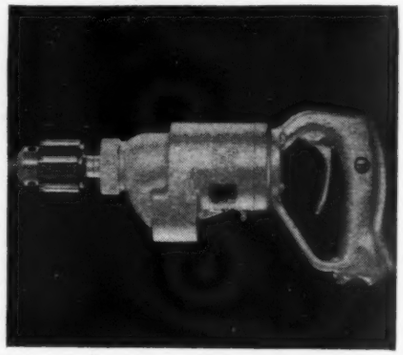
The Rapids-Standard Co., Inc.

370 Peoples National Bank Bldg. Grand Rapids 2, Michigan

in the body of unit directly above the sight. The valve consists of sight feed housing of hexagonal stock with large viewing windows, containing an unbreakable plastic sight or a glass sight (for high temperatures), and regulating unit, including drip nozzle. The valves are available in ¾-, $\frac{5}{16}$-, 1⅛-, and 1$\frac{5}{8}$-in. sizes, and male as well as female pipe threads of ⅛, ¼, ⅜, and ½ inch. Oil-Rite Corp., 3479 South 13th St., Milwaukee 7.

AIR DRILLS

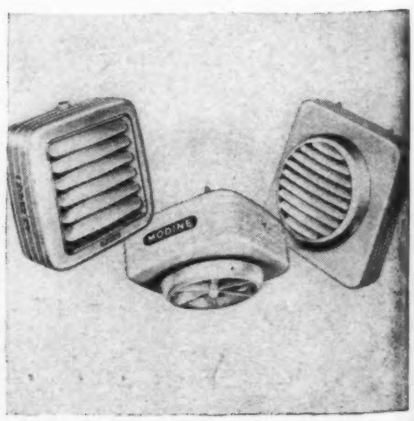
Midget Type M-850 small air drill takes $\frac{1}{16}$-, ⅛-, and $\frac{3}{16}$-in. drills, and can be used for light screwdriving and nut setting, at speeds of 1000, 2000, 4000, and 20,000 r.p.m. Model E-O M-1100 uses ¼-, $\frac{5}{16}$-, and ⅜-in. drills, does ¼- and ⅜-in. screwdriving, at speeds of 1050, 1500, 2000, and 3000 r.p.m. The E-O is equipped with spade handle only, or



spade and auxiliary side handle, and has right-angle attachments for drilling and nut setting. Both types have double adjustable clutches. The torque of the air motor drives the nut down, then clutch gives three impacts per revolution, setting the nut or screw to a predetermined tension. The torque for each nut is set, and clutch release is controlled by an adjustable spring. The Rotor Tool Co., Cleveland.

UNIT HEATERS

Line of propeller unit heaters includes three models with a total of 47 basic capacities. In addition to the horizontal and vertical delivery types, a draw-through unit provides horizontal dis-



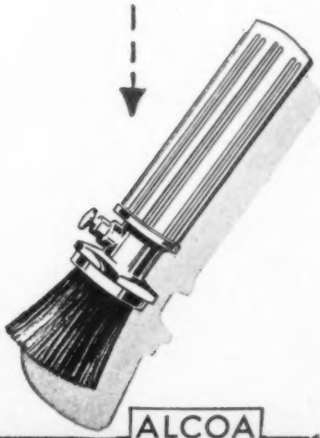
1 step instead of 5

and Alcoa Impact Extrusions give them a finer product

One wallop of the press produces this Alcoa Aluminum impact extrusion —a handle for the Marsh Fountain Stencil Brush. Quite a contrast to the tedious, time-consuming five draws required to make the heavy metal part they previously used.

The fluted outer surface not only dresses up the product, but also provides a nonslip grip. The thick base—four times the thickness of the side wall—takes the punishment meted out when a workman decides to drive a nail with it.

You're many steps nearer the finished product when you start with an Alcoa Aluminum impact extrusion. To learn how they'll fit your processes, get in touch with the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 2126 Gulf Building, Pittsburgh 19, Pennsylvania.



ALCOA

FIRST IN ALUMINUM

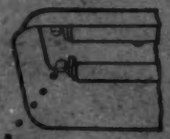
IN EVERY COMMERCIAL FORM

SILV-A-KING FLUORESCENT LIGHTING UNITS

FEATURING A PORCELAIN-ENAMEL FINISH THAT INSURES *LIFETIME* HIGH REFLECTIVITY . . . LOWERS MAINTENANCE COSTS BY REDUCING "CLEANING TIME" . . .

Next time you're considering lighting fixtures, get the "inside story". Look *inside* the fixture . . . If it's snowy white, gleaming, with a hard lifetime surface that's been fired on at 1600° Fahrenheit . . . chances are you're looking at a SILV-A-KING unit. That's important to you from an efficiency-production angle, for it means more and better illumination . . . nearest to natural daylight. It's vital, too, from a maintenance viewpoint, because a quick "once-over" with a damp cloth leaves the reflector surface as brilliantly bright as the day it left the firing ovens.

Among the many features of SILV-A-KING "Specification" Fluorescent Units:



Starters mounted behind lamp holders are easily accessible.

A half turn of the Camloc permits removal of reflector from hood—no tools—no loose parts.

For all the facts on SILV-A-KING fluorescent units ask for a copy of Bulletin #45FS.

RLM

HOME OF

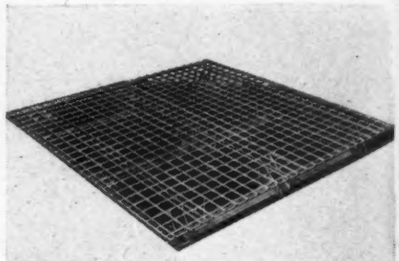
SILV-A-KING *Lighting equipment*

BRIGHT LIGHT REFLECTOR CO., INC. • Fairfield and State—Bridgeport 5, Conn.

charge of heated air over a long range. Known as the Power Throw, it may be used alone, or in combination with the other two units. The three types are available in standard models as well as in models designed to provide low outlet air temperatures when used on steam pressures of 30 pounds or more. Units for hot water application, for drying, and for processing jobs are also included in the line. Features integral, all-brazed copper condenser. Copper tubes and headers are automatically brazed into pressure-resisting units. Copper fins are mechanically and metallically bonded to tubes, and bends in each tube absorb expansion strains. Casings are insulated for quiet operation. Modine Mfg. Co., Racine, Wis.

STEEL WIRE PALLET

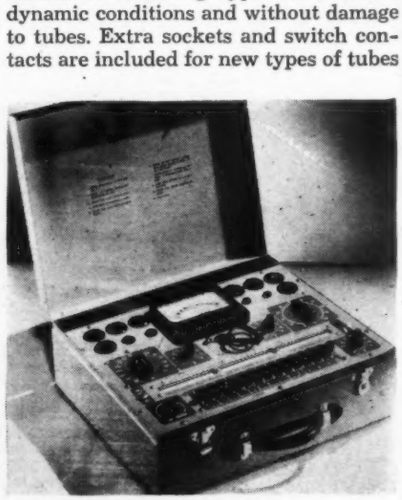
Accessible from any side or corner for fork-lift truck, 8-way steel wire pallet does not rot, warp, or splinter. Said to combine maximum strength with



minimum weight, and to provide positive, safe stacking. Permits vertical strapping, and is easy to keep clean. Union Steel Products Co., 445 Pine St., Albion, Mich.

ELECTRON TUBE TESTERS

Two electron tube testers are based on a patented circuit suitable for standard receiving and several special types of tubes. Counter type 139 and portable type 140 are said to provide accurate checks of receiving type tubes under dynamic conditions and without damage to tubes. Extra sockets and switch contacts are included for new types of tubes



HERE TODAY

the great new 1947 *Modine* Unit Heater Line

HORIZONTAL DELIVERY
23 Models — the most popular type of unit heater for general industrial and commercial applications. Patented Modine center tappings permit direct-from-pipe-line suspension for low cost, fast installation.

VERTICAL DELIVERY
16 Models — designed for overhead installation, up near ceilings of high bays to clear plant production equipment, or at low levels as in stores and offices. Delivers large volume of air at even temperatures.

NEW POWER-THROW
8 Models — a new type of draw-through horizontal delivery unit heater designed for specialized industrial applications. Powerful, scouring jet action provides "long distance" penetration in hard-to-heat areas.

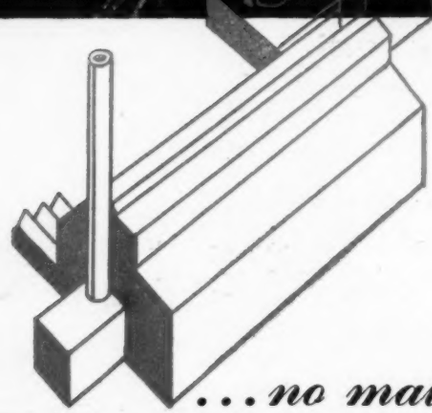
Three Distinct Types — to meet the challenge of today's complex heating requirements! Never before has propeller unit heater design been so closely adapted to the expanding applications of unit heating . . . or to the critical requirements of unit heater application engineers! In this new 1947 line, Modine now gives you three separate and distinct types, developed as a matching, integrated line with *47 basic capacities* . . . designed to meet the space heating needs of practically all modern industrial and commercial buildings. Modern styling and beautiful color treatment of all models opens a broad new range of installation opportunities. Advanced design features improve heating performance . . . lengthen service life . . . offer greater versatility of application. If you're planning to heat a new plant or store, investigate the Modine line. For complete information, see the "Where To Buy It" section of your phone book, or send in coupon below.

Modine
UNIT HEATERS

FREE!
Tear out coupon
Send for complete Catalog

MODINE MANUFACTURING CO.
1730 Racine Street, Racine, Wisconsin
Gentlemen: Yes! I want all the facts about the great, new 1947 Modine Unit Heater Line. Please send me your new catalog.
Name.....
Position.....
Company.....
City.....State.....

VIBRATIONLESS



. . . no matter where

SCHRAMM AIR COMPRESSORS

are installed in your plant!

No vibration . . . but all the air you want! Schramm Air Compressors are easily installed, require a minimum of space, and are compact: yet NO VIBRATION!

Schramm Air Compressors are specified by industry today because they furnish all the air you want, whenever and wherever you want it. Each unit is tested before it leaves the factory, and goes to work as soon as it is installed.

Both stationary and portable units are available, in every size mounting and assembly. A new Booklet giving full construction details and advantages you get with Schramms is yours for the asking. Write us today for your copy.

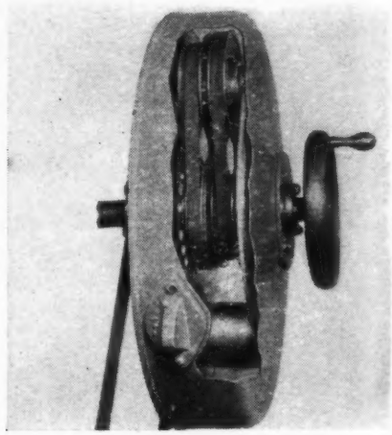
SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

developed. Tests for shorts may be made without danger of grid-filament contacts from electrostatic attraction in battery type tubes where spacing between the elements is close, maker says. Provision is also made for noise testing. Both instruments are supplied for 105-125 volt, 50-60 cycle a.c. operation, and are rated at 20 watts. Controls are accessible and all markings, including those on the 4½-in. meter face, are easily read. Radio Tube Div., Sylvania Electric Products Inc., 500 Fifth Ave., New York 18.

VARIABLE SPEED DRIVE

Using planetary motion in which two standard cross-section V-belts and four variable pitch pulleys provide infinite ratio, stepless speed from full in one direction through zero and into full reverse at constant torque of 2 horsepower, Variable-V-Planetary Speed Selector is announced. In operation the unit compares the ratios of the two V-belt drives and applies the difference in speed to output shafts. Speeds from 400 r.p.m. to

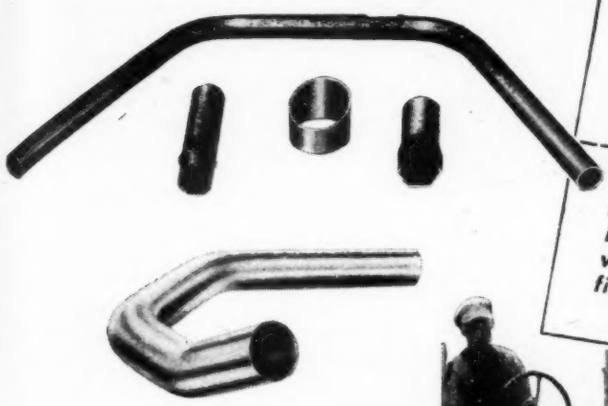


zero, forward and reverse, can be obtained. All changes are made by a hand control wheel, which alters the pitch diameter of the center pulleys. It is mounted on the input shaft of the driven machine, and covers the complete speed range in four and one-half turns. Remote controls are available. Frame is aluminum with cast-iron sheaves, and unit has pre-lubricated, plastic seal, ball-type bearings. The B. F. Goodrich Co., Akron, Ohio.

INTERCOMMUNICATION SYSTEMS

Type L Deluxe Communophone systems are said to permit the installation of every type of system from the simplest to the most complex. The LA series is for systems employing one master and a number of remote stations. Master stations may be equipped with earphone for privacy. The LC series comprises all master systems, providing a number of private simultaneous two-way conversations between masters. The LS series provides systems in which a number of

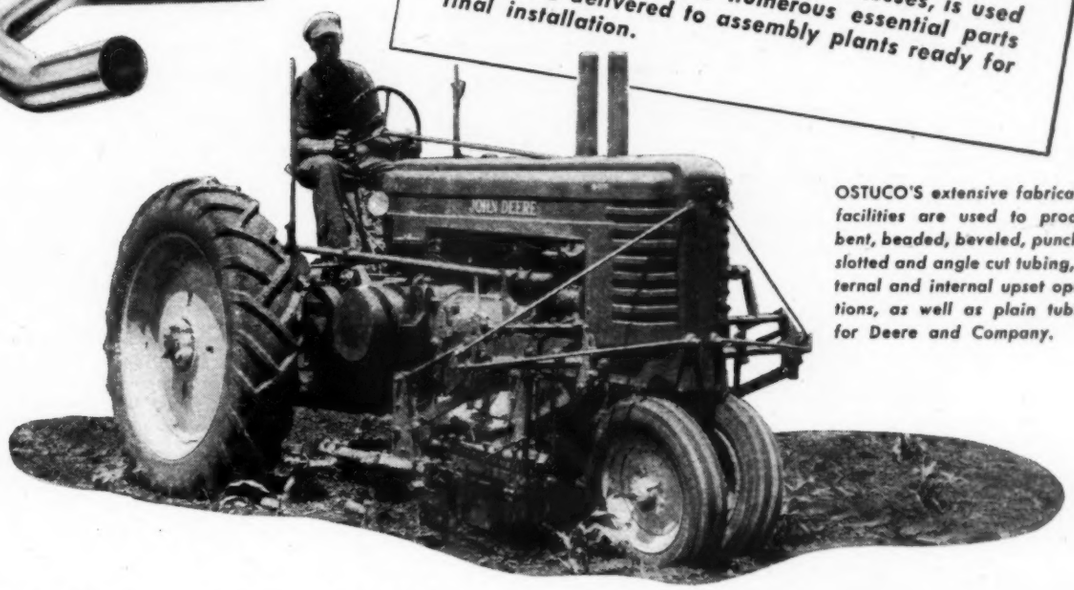
Problem ~~TROUBLE~~-SHOOTING *with* SEAMLESS STEEL TUBING



FARM EQUIPMENT INDUSTRY

The Problem: To meet greatly increased demands for farm tractors and equipment, production and assembly processes must be simplified to increase productive output.

The Answer: OSTUCO Steel Tubing, adaptable to a wide variety of fabricating processes, is used in the manufacture of numerous essential parts which are delivered to assembly plants ready for final installation.



OSTUCO'S extensive fabricating facilities are used to produce bent, beaded, beveled, punched, slotted and angle cut tubing, external and internal upset operations, as well as plain tubing, for Deere and Company.

In the assembly of the famous John Deere tractors, numerous parts, ranging from radiator vent drain tubes to exhaust pipes, are furnished by The Ohio Seamless Tube Company. Deere and Company, alert to every opportunity to streamline production, has found OSTUCO Steel Tubing, fabricated to its specific requirements, a means of eliminating extensive, time-consuming operations in its own plants.

OSTUCO tubing, inherently strong and lightweight, is ideally suited for applications where severe usage is expected, yet its uniform quality permits its use in the most complicated fabricating processes. As a manufacturer, you'll be interested in learning how OSTUCO's skilled craftsmanship* and engineering experience can help improve your production picture. Write to the nearest sales office for your free copy of "M-1," an informative booklet on steel analyses, tolerances and machining methods.

**This is Walter Oman, one of the many members of the OSTUCO 50-Year Club, all veterans who have devoted a lifetime developing the skill and ability that contribute so much to the OSTUCO tradition of quality . . . a tradition as old as the history of tube-making itself.*

THE OHIO SEAMLESS TUBE COMPANY

SALES OFFICES: Chicago 6, Illinois, Civic Opera Bldg., 20 North Wacker Dr.; Cleveland 14, Ohio, 1328 Citizens' Bldg.; Detroit 2, Michigan, 2857 E. Grand Blvd.; Houston 2, Texas, 927 A M & M Bldg.; Los Angeles, Calif., Suite 200-170 So. Beverly Drive, Beverly Hills, California; Moline, Illinois, 225 Fifth Avenue Bldg.; New York 17, New York, 70 East 45th Street; Philadelphia 9, Pa., 123 S. Broad St.; St. Louis 6, Missouri, 1220 North Main St.; Seattle, Washington, 1911 Smith Tower; Syracuse, New York, 501 Roberts Ave.; Tulsa 3, Oklahoma, Refining Engine & Equipment Co., 604 Ten E. 4th St. Bldg.

• Canadian representative: Railway & Power Engineering Corp., Ltd. Hamilton, Montreal, Noranda, North Bay, Toronto, Vancouver, Windsor and Winnipeg.

SHELBY OSTUCO OHIO

Plant and Main Office
SHELBY, OHIO

MANUFACTURERS OF SEAMLESS AND ELECTRIC-WELD STEEL TUBING

FULL FACE PROTECTION against light flying particles

HEADLINE* COMFORT for day long wearing ease!

* *Headline Design* fits natural head contours—*no pressure points!* Lightweight assembly supported by center strap across head--*greater comfort!*

M·S·A FACESHIELDS

Durable, easy to wear protection for eyes and face is afforded the workers who wear this modern equipment! Ideal for light grinding and other jobs where minor eye hazards exist, M.S.A. Faceshields are efficient in design, built of top quality materials, available in three headgear types, and three visor lengths of various shades and thicknesses. Full details in Bulletin CN-1—write for your copy!

MINE SAFETY APPLIANCES COMPANY
Braddock, Thomas and Meade Sts. Pittsburgh 8, Pa.
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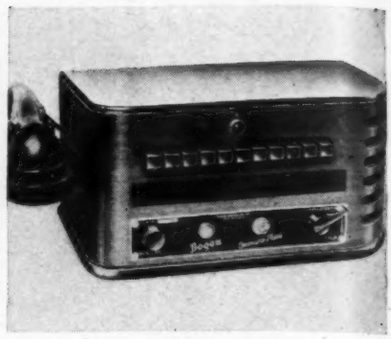
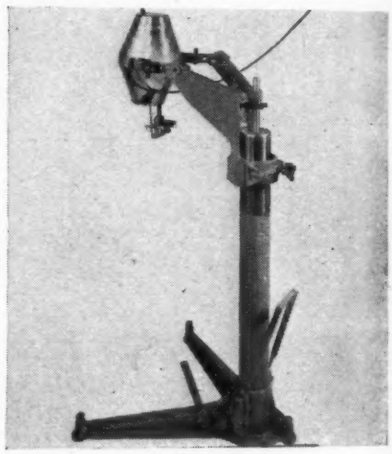
TORONTO · MONTREAL · VANCOUVER · CALGARY · WINNIPEG · NEW GLASGOW, N. S.



masters can operate in conjunction with a number of remotes. The LA, LC, and LS master units are available in two types with either 10 or 20 selective push-buttons. Handsets can be obtained for the LC and LS series. Operation is for 110-volt a.c. David Bogen Co., Inc., 663 Broadway, New York 12.

MARKING MACHINE

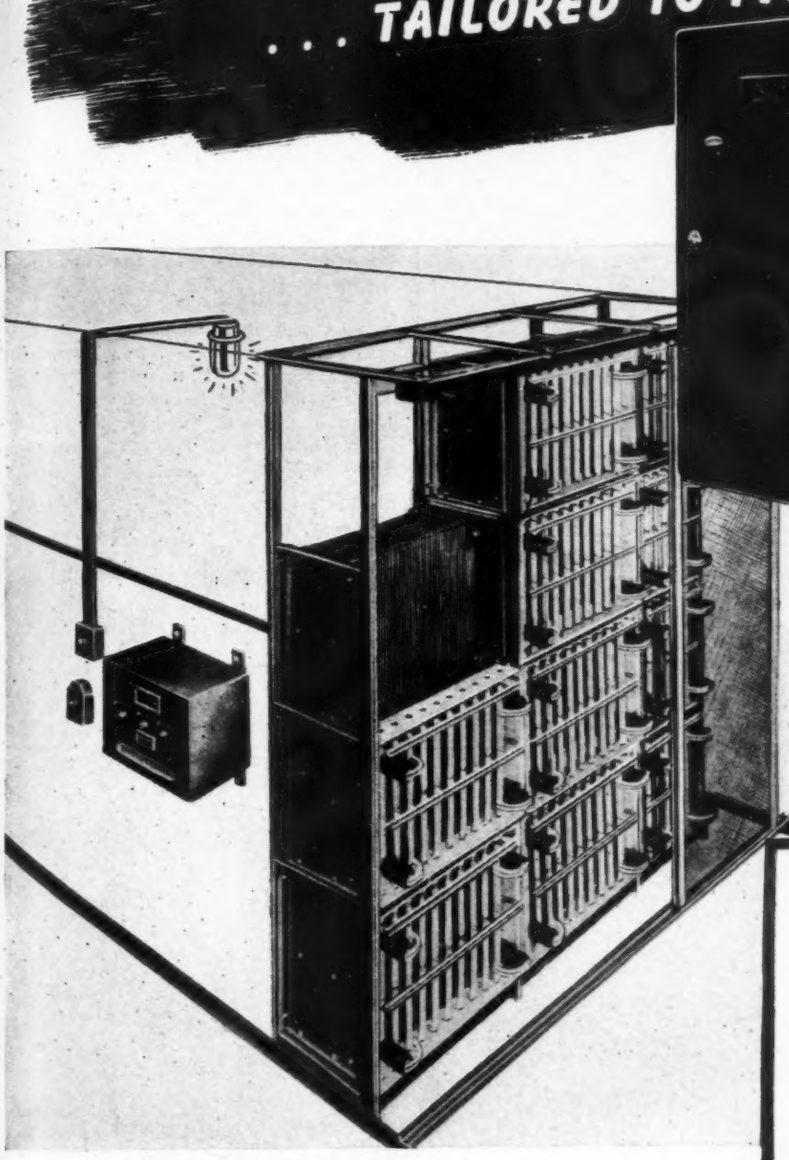
Portable on a single caster in its base, for marking operations in different locations, Markomatic 9C is adjustable in all three planes for carton-size variations. Stands on the floor, and has a pedestal, column, and switch. Adaptable to mark moving objects on conveyors and packaging or materials handling machines without stopping them. The machine marks in a designated space and on recessed surfaces, and is said to afford instant synchronization between marking operation and product flow. Regular spacing between or indexing of objects is not required. Object speed may be up to 100 f.p.m. Adolph Gottscho, Inc., 1 Hudson St., New York 13.



HYDRAULIC HIGH-PRESSURE PUMP

Series 700 pump is designed for high-pressure application for materials handling equipment, machine tools, power transmission, proportioning equipment, and low-capacity pressure circulation and delivery functions. The direct-drive spur gear pump is a small 6-lb. unit

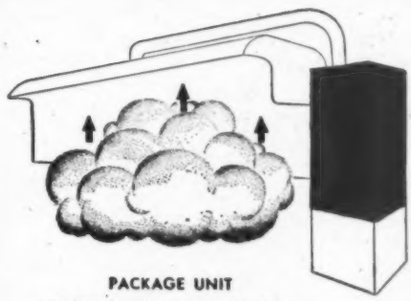
RAYTHEON ELECTRONIC AIR CLEANING ... TAILORED TO FIT YOUR NEEDS



COMPLETE PACKAGE UNITS can be put right to work in smaller areas. Available in several sizes, with capacities of 200 to 2250 c.f.m.

FOR LARGE AREAS or installation in existing duct systems, the cell-unit type Precipitator can be built up to provide any required capacity.

FOR RECOVERY OF FLUIDS and certain types of solids, Raytheon Package Type Precipitators can be furnished with recovery chamber, and readily adapted for use with any type hood.



PACKAGE UNIT
with hood and recovery chamber

Before you invest in air cleaning equipment, consider the extra advantages offered by RAYTHEON.

Built in any capacity from 200 c.f.m. up, RAYTHEON Precipitators supply electronically-cleaned air for any area regardless of size. These new, high-efficiency units remove virtually all airborne dust, smoke, pollens, oil mist, etc. down to particles as fine as 1/250,000 of an inch.*

Wherever clean air pays dividends ... as in processing, high-precision fabricating, measuring, testing ... there's a RAYTHEON Precipitator of the exact size and type to fit your needs.

Write today for Bulletin DL-P-503 and 505

*According to Bureau of Standards discoloration tests, the Precipitator is more than four times as efficient as any mechanical filter.

RAYTHEON

Excellence in Electronics

RAYTHEON MANUFACTURING COMPANY

Industrial Electronics Division
Waltham 54, Massachusetts

Builders of Raytherm Dielectric Heaters for every industrial application. Synchronous Controls for Resistance Welding and other Electronic Products for Industry

Sales Offices: Atlanta • Boston • Chicago • Cleveland • Louisville • New York

Again and Again ... They Come Back for THE MOTORIZED HydroLectric

Famous firms continue to re-order HYDROLectric Lift Trucks for one basic reason:
They find HYDROLectrics superior, in performance and economy, to any other motorized lift trucks.

They know they can depend on every HYDROLectric to do the work ordinarily requiring 3 or 4 men. Move bigger loads with effortless ease. Speed up handling amazingly . . . Operate 24 hours a day, with absolute safety and negligible downtime . . . Afford sensational economies—cut handling costs as much as 75%. Users state their HYDROLectrics quickly pay for themselves 5 to 10 times yearly.

Write today for Folder A for details about this remarkable motorized truck.

USED BY AMERICA'S LEADING INDUSTRIES

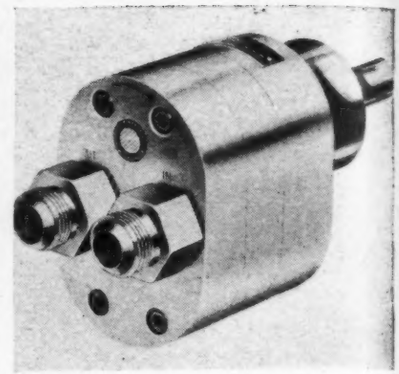
Bendix Aviation, Crucible Steel Casting Co., Electric Storage Battery Co., Firestone Tire & Rubber Co., Goodyear Tire & Rubber Co., R.C.A. Victor, Reynolds Metal Co., Wright Aeronautical Corp.—and hundreds of others.

NO OTHER TRUCK HAS ALL THESE FEATURES

Positive gear drive to load wheel
4 wheels for stability
Costs only 1/3 and weighs only 1/3 of other powered trucks of equal capacity
Records up to 21 years of 8-hour-day performance

LIFT TRUCKS INC. W.W.W. STUEBING CINCINNATI

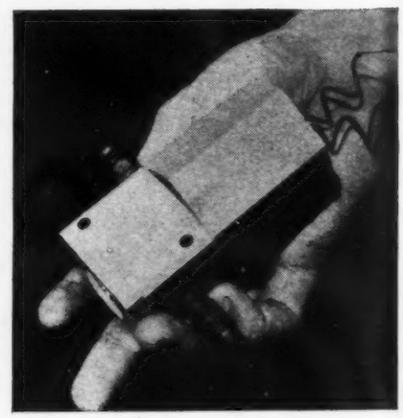
LIFT TRUCKS, INC.
Walter Stuebing, President
2425 Spring Grove Ave. Cincinnati 14, Ohio



built to operate with a volumetric efficiency in excess of 90 percent, and a mechanical efficiency in excess of 80 percent. Four models displace from 0.4 to 9.6 g.p.m. at speeds ranging up to 1750 r.p.m. against working pressures up to 1000 p.s.i. All parts are interchangeable. Power requirements vary between fractional to 6½ horsepower. Pump body is aluminum with nitrided nitralloy gears. The McIntyre Co., 712 Riverdale Ave., Newton, Mass.

SOLENOID VALVE

Solenoid is combined with 2-way valve in one compact unit for remote control of the hydraulic valve. Small size (1¼ pounds, and $3\frac{9}{16}$x1¾ inches) permits installation in hard-to-reach or congested areas. Housing, made of aluminum alloy bar stock anodized, has two ⅛-in. NPT



female ports and two mounting holes. Accommodates flows up to 2 g.p.m., and the pressure range is from a fraction up to 1500 p.s.i. Two 4-in. flexible lead wires are provided on the standard valve, but longer lead wires can be obtained. Twelve- to 24-volt d.c. is required to energize the continuous-duty solenoid. Electrol, Inc., 85 Grand Street, Kingston, N. Y.

SAFETY DOOR SIGNAL

Designed to prevent truck-door collisions in busy warehouses and garages, the Dor-Signal Blinker Safety Control presents a stop-light signal to the driver when doors are in motion and there is

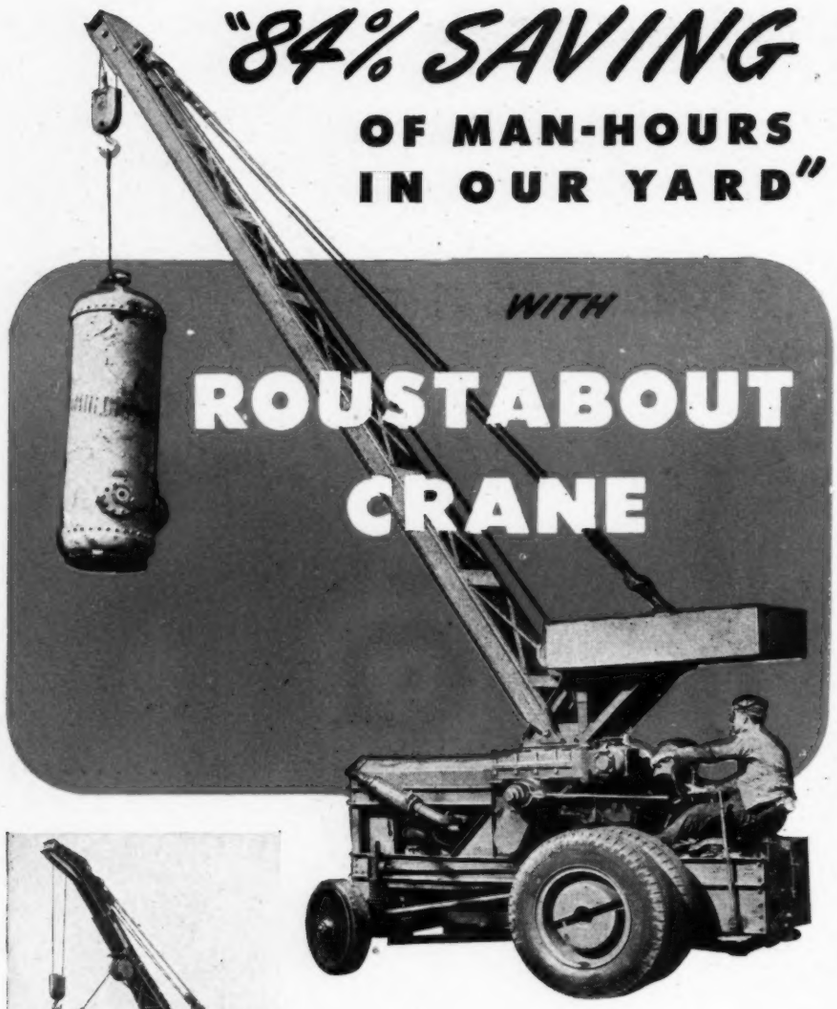
Designed exclusively for table rollers, these sturdy, two-piece pillow blocks permit the *most* load carrying capacity in the *least* space. They're readily adaptable for use with a central lubricating system, they may be cast in iron or steel, and they're equipped with the exclusive SKF Triple Seal that keeps lubricant *in* . . . dust, scale and water *out*. Let our engineers show you how SKF Pillow Blocks can reduce operating costs by protecting the bearings on *your* table rollers.

5969

SKF INDUSTRIES, INC.
Front Street & Erie Ave., PHILA. 34, PA.

SKF
BALL AND ROLLER
BEARINGS

"84% SAVING
OF MAN-HOURS
IN OUR YARD"
WITH
ROUSTABOUT
CRANE



● With magnet, Roustabout handles large or small castings.

● With grab-bucket Roustabout hustles sand, cinders, etc

● "Man-hours reduced to 1/7 of former needs." "75% reduction in man-hours." "Saves about 60% on man-hours." "60 to 80% saving in time and man-hours." These are common reports from Roustabout users who mechanize their yards with this mobile load-hustler that goes *where* you want it *when* you want it, keeps things moving, prevents costly delays. Modernly built for years of overwork, loads to 7½ tons. Write now for facts about this profitable Roustabout hundreds of plants wouldn't be without!

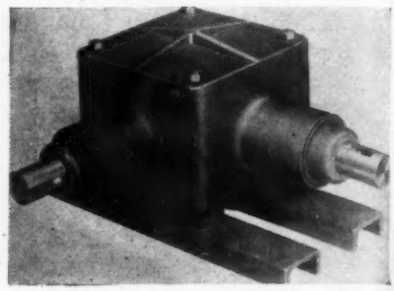
THE HUGHES-KEENAN COMPANY
623 NEWMAN STREET • MANSFIELD, OHIO

ROUSTABOUT CRANE
Roustabout Cranes
By Hughes-Keenan
Load-Handling Specialists Since 1906

insufficient clearance. The lights, inside and outside, connected to the door switch circuit, operate automatically. Can be installed in existing a.c. or d.c. circuits. Features all-weather, all-climate operation, day or night, inside and outside; and operates on 110- to 120-volt circuits. P. M. Co., 222 South 12th Street, Newark 7, N. J.

MITER GEAR UNIT

Developed particularly for slow speed and high torque for intermittent operation, such as control of oven doors, shafting at right angles, valves, and similar applications, miter gear unit may be used in any position. The gears are of the straight bevel type, with 1:1 ratio, and the steel shafts operate in grease-lubri-



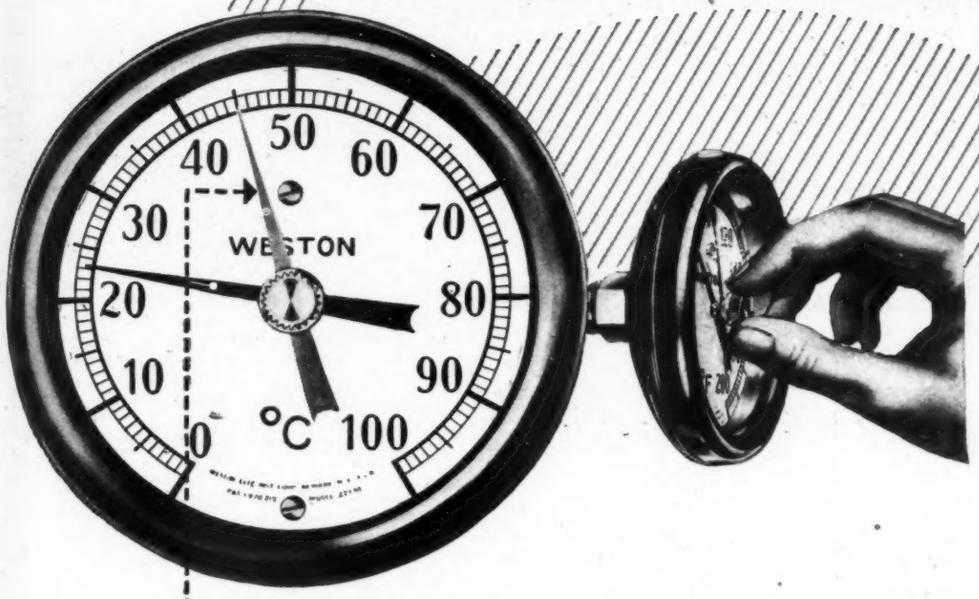
cated bronze bearings. The weatherproof case is of cast iron with gasketed cover, and with oil seals in the bearings. Two sizes are available with a capacity of 1000 and 4000 inch-pounds, for 5-min. operation. The unit has no feet, but is drilled at four points in the base, and can be bolted to common channel iron. Payne Dean & Co., Laconia, N. H.

CONTROL VALVES

Diaphragm-operated control valves for flow diversion service are of the 3-way type. The position of the valve plug determines the diversion of flow between the two outlet ports. Made in sizes ½ to 6 inches, in cast iron, steel, bronze, or

NEW all metal WESTON

MAXIMUM-MINIMUM Thermometer



RED INDEX shows the highest or lowest temperature reached!

Simply swing the red index to the low side of the temperature pointer, and the index will move to the *lowest temperature reached,* and *remain there* until manually reset. For *highest temperature* record, simply swing the red index around to the high side of the pointer.

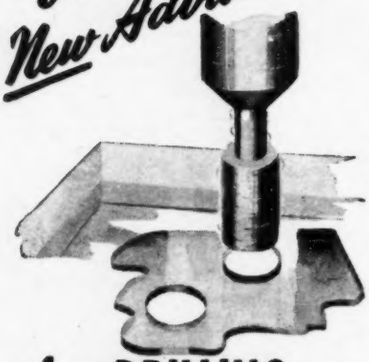
The index movement in no way impairs the guaranteed high accuracy of the WESTON Thermometer.

Thus the WESTON Maximum-Minimum Thermometer provides, at only slightly above ordinary thermometer prices, a means of obtaining high or low temperature records on equipment or processes where these extreme temperatures are critical. Ideal for transformers, sterilizers, ovens, chemical equipment, food processing, etc. For complete information, consult your nearest WESTON representative. WESTON ELECTRICAL INSTRUMENT CORPORATION, 628 Frelinghuysen Avenue, Newark 5, New Jersey.

Weston Instruments

ALBANY • ATLANTA • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • JACKSONVILLE • KNOXVILLE • LOS ANGELES • MERIDEN • MINNEAPOLIS • NEWARK
NEW ORLEANS • NEW YORK • PHILADELPHIA • PHOENIX • PITTSBURGH • ROCHESTER • SAN FRANCISCO • SEATTLE • ST. LOUIS • SYRACUSE • IN CANADA, NORTHERN ELECTRIC CO., LTD., POWERLITE DEVICES, LTD.

HABIB Tube-Type DIAMOND DRILLS Offer *Outstanding New Advantages*



for DRILLING or TREPANNING GLASS and Other Abrasive Materials

COMPLETELY DIFFERENT in construction, these NEW drills have diamond particles ***distributed throughout the whole wall section.*** Thus Habib drills—and only Habib—***always cut with a diamond-impregnated EDGE;*** give clean, rapid cutting ***throughout their entire life.***

Since the walls are only .023" thick (approx.), Habib drills remove a minimum of material—which again means rapid cutting. Cores are ejected automatically.

These drills readily cut through ¼" of glass in 30 to 40 seconds, and are good for many thousands of holes. They are available in all sizes from 3/32" to 3" diameter, and can be used in any standard drill press.

For NEW speed and economy in drilling or trepanning glass, quartz, ceramics, sapphire, marble and all similar materials, specify Habib Diamond Drills. Descriptive bulletin and prices on request.

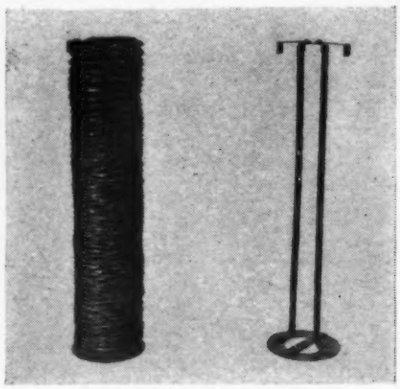
THE Wickman CORPORATION
15533 WOODROW WILSON AVE.
DETROIT 3 • MICHIGAN

A. C. WICKMAN (Canada) Ltd.
P. O. Box 9, Station N, Toronto, Ont.

stainless steels in cast form. Features through-bolted bonnet and blind-headed flanges, all-steel diaphragm superstructure, valve position indicator, 2-ply neoprene diaphragm, grease lubricator for stuffing box, bolted stuffing box gland. Suitable for operation with standard 2- to 15-lb. air output controllers or for controllers requiring special spring rangers. Airfin bonnets are available for high temperature service. Hammel-Dahl Co., 243 Richmond St., Providence 3, R. I.

RETRACTABLE TUBING CARRIER

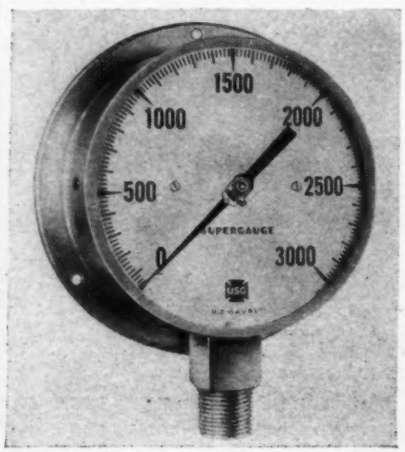
Combination carrier and stowage rack handles retractable tubing or stores it when not in use. The rack, called Spira-Tote, comes in sizes to accommodate various lengths and diameters of tubing. Hinged extension pieces at the top of the



rack turn to permit the tubing to slip on the rack, then move out, locking tubing in place. Made of steel, finished with enamel, it is light in weight, and top cross piece provides a grip for carrying. The Warner Bros. Co., Dept. 53, 325 Lafayette St., Bridgeport 1, Conn.

PRESSURE GAGE

Internal parts are made of high grade non-corrosive metals in heavy-duty type pressure gage, called Supergauge. The working elements are designed to withstand repeated pulsation and vi-



Silicone News

DC SILICONES

Is DC 996 the key to the market for air cooled transformers?

When transformer coils look like this after 6 months of service, there is a place for heat-resistant Silicone Insulation in air-cooled transformers. Certainly an eager market awaits a serviceable, lightweight transformer. Electrical engineers are now working to supply that market with transformers insulated with inorganic materials impregnated with DC 996.

The added heat resistance of DC 996 offers a potential reduction of 30% to 50% in size and weight compared with other air-cooled transformers and up to 75% reduction compared with oil-filled transformers of equal capacity. Increased reliability due to the greater moisture-proofness, thermal stability, and chemical resistance of DC 996 iz another advantage. Important also is the virtual elimination of fire hazard.

Preliminary testing of Silicone insulated transformers indicates that by proper design, performance characteristics can be kept within the limits specified for larger and heavier transformers built with conventional materials.

Recommended procedures for applying DC 996 are available in leaflet No. E 3-1.

SILICONE GREASES—Essential to the higher operating temperatures made possible by Silicone Insulation, and for bearings of machinery in hot locations are high temperature silicone greases. One application of DC 44 was effective for 5¼ months of continuous operation at 125° C. (257° F.) in the bearings of a 7½ h.p., 1750 r.p.m., 440-volt silicone insulated induction motor. Data Sheet No. E 7-1 contains additional information about Dow Corning Silicone Greases.

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

Chicago Office: Builders' Building
Cleveland Office: Terminal Tower
New York Office: Empire State Building
In Canada: Dow Corning Products Distributed by Fiberglas Canada, Ltd., Toronto

Dow Corning
FIRST IN SILICONES

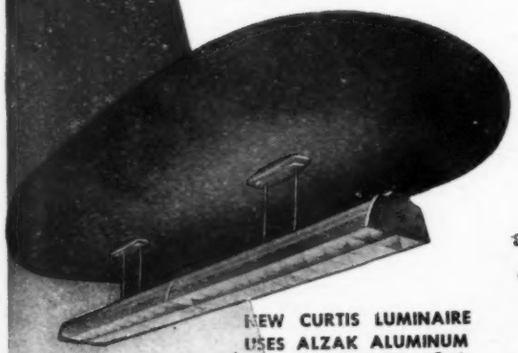
Design Unshackled!

ALZAK* ALUMINUM'S EASY

Formability GIVES YOU FREE REIN!

The formabilty of Alcoa Aluminum Reflector Sheet gives you freedom of design; the metal is readily formed, spun, or drawn to carry out your own individual ideas for reflector or fixture design . . . and lighting efficiency. This formability is a big plus, when you add it to the other advantages of Alzak Aluminum Reflectors: corrosion and heat resistance, surface stability; in short, *sustained high efficiency*, for either specular or diffuse applications. Consult your reflector manufacturer regarding specifications for Alzak Aluminum, or other finishes of Alcoa Reflector Sheet. ALUMINUM COMPANY OF AMERICA, 1941 Gulf Bldg., Pittsburgh 19, Pennsylvania. Sales offices in principal cities.

*PATENTED PROCESS



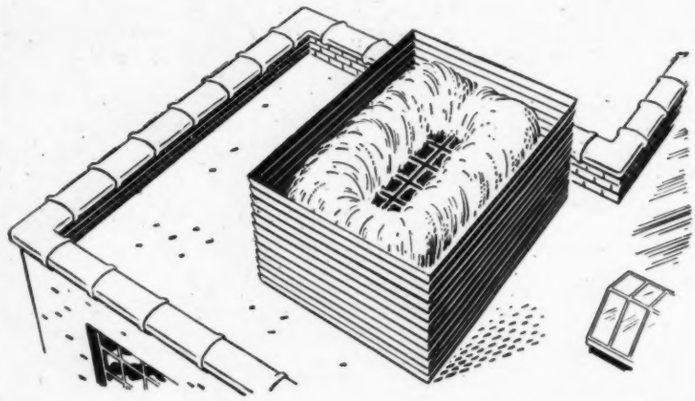
NEW CURTIS LUMINAIRE USES ALZAK ALUMINUM

For offices, drafting rooms, schoolrooms, the new Curtis "Forty-Sixty" Luminaire makes use of Alzak Aluminum's efficiency to direct approximately 40% of the light upward, 60% downward, provide ideal working light.

FIRST IN

ALCOA ALUMINUM

IN EVERY COMMERCIAL FORM



LIKE BEING IN *Hot Water*

ALL THE TIME

There's trouble aplenty for ordinary wood when it goes into the construction of a cooling tower—exposed continually to a water spray, and the elements. Pressure treatment with Wolman Salts* preservative prevents the decay that weakens and destroys ordinary lumber in cooling tower frames and louvers. Records show Wolmanizing extends the life of wood in this service from two to four times.

Maybe the conditions are not quite so severe with the structure you're building, but—Wolmanized Lumber is famous for resistance to decay and termite attack.

Whatever your needs—

AMERICAN LUMBER GIVES YOU ALL 3

1 Wolmanized Lumber—protects against decay and termite attack

2 Minalith—fire-retardant

3 Creosoted Lumber

*Registered trademarks

1676 McCORMICK BUILDING, CHICAGO 4, ILLINOIS

bration, as well as abnormally high overpressures. For use on boilers, diesel engines, hydraulic equipment, compressors, and pumps, the gage is made for pressures ranging from 30 to 10,000 p.s.i., and comes in 4½-, 6-, and 8½-in. dial sizes. United States Gauge Division, American Machine & Metals, Inc., Sellersville, Pa.

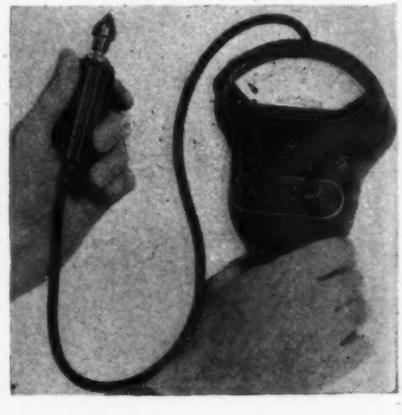
BALL VISE

Holding work at any desired angle, with no dead motion, universal ball vise permits quick change in work position by lever lock and release. Parallel ground surfaces of hardened anvil and jaws aid in compound angle setting. Nut is horizontally anchored, giving a straight pull close to vise jaws. Body of vise is

entirely closed, keeping out dust and chips. Jaws are interchangeable and reversible, hardened to 55-58 C. Rockwell. Extra copper, brass, or serrated jaws can be supplied. The base is a close grained casting, and ball is hard chrome-plated and finished for full holding surface. Reypo Corp., 9900 Lincoln Blvd., Los Angeles 45.

LOW-SPEED TACHOMETER

Developed for direct measurement of speeds down to 10 r.p.m. and 1 f.p.m., hand tachometer Type 25B has ranges of 10 to 200 r.p.m., 20 to 400 r.p.m., and 50 to 1000 r.p.m. Fingertip control is provided on the indicating unit. No damage is said to result to the instrument if



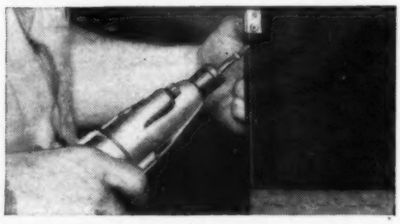
YORK credits Phillips Screws

"Faster driving cuts assembly time and costs in shift to mass production"

— REPORTS INVESTIGATOR from James O. Peck Co., industrial research authorities who are studying assembly methods in leading plants. At York Corp. he got information valuable to mass producers. Highlights follow:

"Phillips Screws were a big help in working out methods of large scale production of the Yorkaire Room Conditioner," the plant superintendent of the York Corp. told the James O. Peck Co. investigator. "To get production we knew we'd have to use self-tapping screws and power drivers on our sheet metal assemblies, but that got us into a lot of trouble with slotted screws.

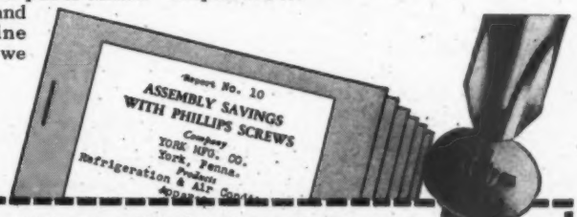
"The Phillips Recessed Head Was a Natural for Power Drivers and Self-tapping Screws. No trouble locating screws or keeping bits in the screw head. No damaged panels or other handicaps that slow down production. Since we adopted the Phillips Head in '37 it's been standard on all sheet metal assemblies.



"One-Hand Driving Is Easy With the Phillips 'Engineered Fit'. The precision recess snugs right onto the bit of the power driver and sticks there, making it so easy for the operator to center the screw in the hole that he can hold the work with one hand and drive with the other.

"Eliminated the Tremendous Amount of Screw Driver Slippage. Panels were no longer chewed up, a stop was put to turned or burred screw heads and the whole assembly line speeded up the moment we changed from slotted to Phillips Screws."

Important Information for You is available in the unabridged report by this independent investigator of the York Corporation's experience with Phillips Screws. *Other reports,* covering assembly practises in 9 prominent plants making products of metal, wood and plastics, are yours for the asking... FREE! Use the coupon NOW.



PHILLIPS *Recessed Head* SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

American Screw Co.
Atlantic Screw Works
Atlas Bolt & Screw Co.
Central Screw Co.
Chandler Products Corp.
Continental Screw Co.
Corbin Screw Div. of American Hdwe. Corp.
The H. M. Harper Co.
International Screw Co.
Lamson & Sessions Co.

26 SOURCES

Manufacturers Screw Products
Milford Rivet and Machine Co.
National Lock Co.
National Screw & Mfg. Co.
New England Screw Co.
Parker-Kalon Corporation
Pawtucket Screw Co.
Pheoll Manufacturing Co.
Reading Screw Co.
Russell Burdsall & Ward Bolt & Nut Co.
Scovill Manufacturing Co.
Shakeproof Inc.
The Southington Hardware Mfg. Co.
The Steel Company of Canada, Ltd.
Sterling Bolt Co.
Wolverine Bolt Company

Phillips Screw Mfrs., c/o Horton-Noyes 10
2300 Industrial Trust Bldg., Providence, R. I.

Send me reports on Assembly Savings with Phillips Screws.

Name.....

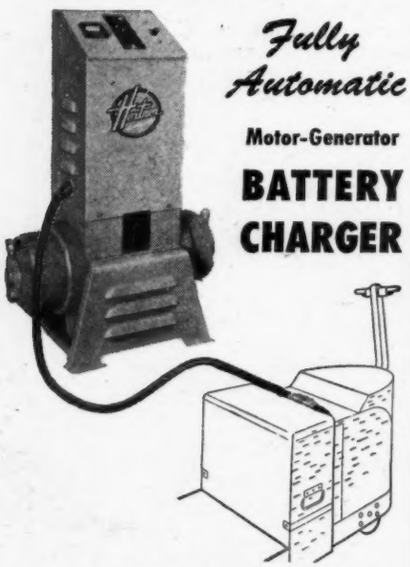
Company.....

Address.....

.....

For PEAK PERFORMANCE from your Motorized LIFT-TRUCKS Every Day

use the **HERTNER** Type "H"



Fully Automatic

Motor-Generator

BATTERY CHARGER

FULLY CHARGES LEAD-ACID BATTERIES
in 8 hours
NICKEL-ALKALINE BATTERIES
in 7 hours

Automatic Charging Rate

Amount of charge is governed by completely automatic controls—over-charging is impossible, yet a fully rundown battery can be completely charged in normal charging time.

Automatic Shut-off

Completely automatic controls cut off the charge and shut down the motor-generator when the battery reaches full charge.

Automatic Restart

In the event of power failure, generator shuts off automatically and when power is restored motor-generator automatically restarts and charging is resumed.

"Automatic" Economy

Due to the inherent characteristics of motor-generator design, the Hertner Type "H" charger provides "automatic" economy.

Write for Bulletin 101 describing Type "H" single-battery charger. Hertner Type "H" chargers are also available for charging 2 or more batteries at one time. Write for Bulletin 102.

The HERTNER Electric Co.
A General Precision Equipment Corporation Subsidiary
Motors • Generators • Motor-Generator Sets
12750 Elmwood Avenue, Cleveland 11, Ohio
Representatives in principal cities throughout the world

speed range is varied while tachometer head is engaged with rotating shaft, or by over-speeding. Tachometer head is a double-pole, double-throw switch connected in a series circuit consisting of a battery, condenser, and milliammeter. The instrument is supplied in carrying case with all the necessary contact tips and disks for measuring linear speeds. Low- and high-speed adapters are available. Metron Instrument Co., 432 Lincoln St., Denver 9.

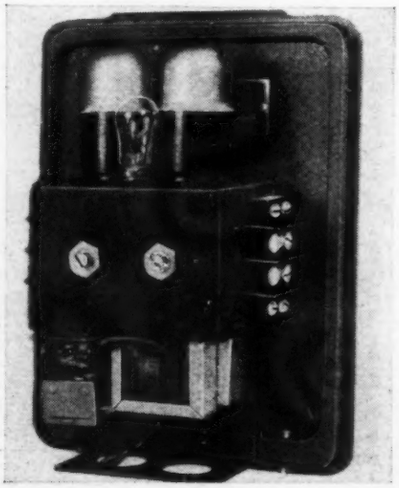
ILLUMINATED CLIPBOARD

Ray-Rite illuminated clipboard has been developed for use where light is needed for writing or checking in poorly lighted or unilluminated areas. Powered by two standard flashlight batteries with the light bulb set in a reflector built into a

strong spring clip, the unit is constructed of metal and mounted on a masonite backboard. Supplied in two sizes: 7x12 or 9x14 inches. Lennan Lights, Inc., 231 West Olive Ave., Burbank, Calif.

TEMPERATURE CONTROL UNIT

Close temperature-variation control, variation as low as ⅕ deg. F., and power "on-off" cycles as short as 3 seconds are claimed possible with the Xactline unit. It does not use cams, motors, bearings, shafts, gears, or other rotating mechani-



Give a Worker a

HAND CLEANSER...

...he can use with confidence, one that cleanses quickly, thoroughly, yet gently and safely, that prevents defatted skin and keeps vital hands in "tip-top" working condition!

These Qualities You Can Depend On With

Lightfoot *Industrial* HAND CLEANSERS

INTEGRATION is the secret of Lightfoot's speedier, more thorough yet more gentle cleansing. This exclusive process results in perfect uniformity of texture and mixture, in which *each individual particle is a complete* cleanser in itself.

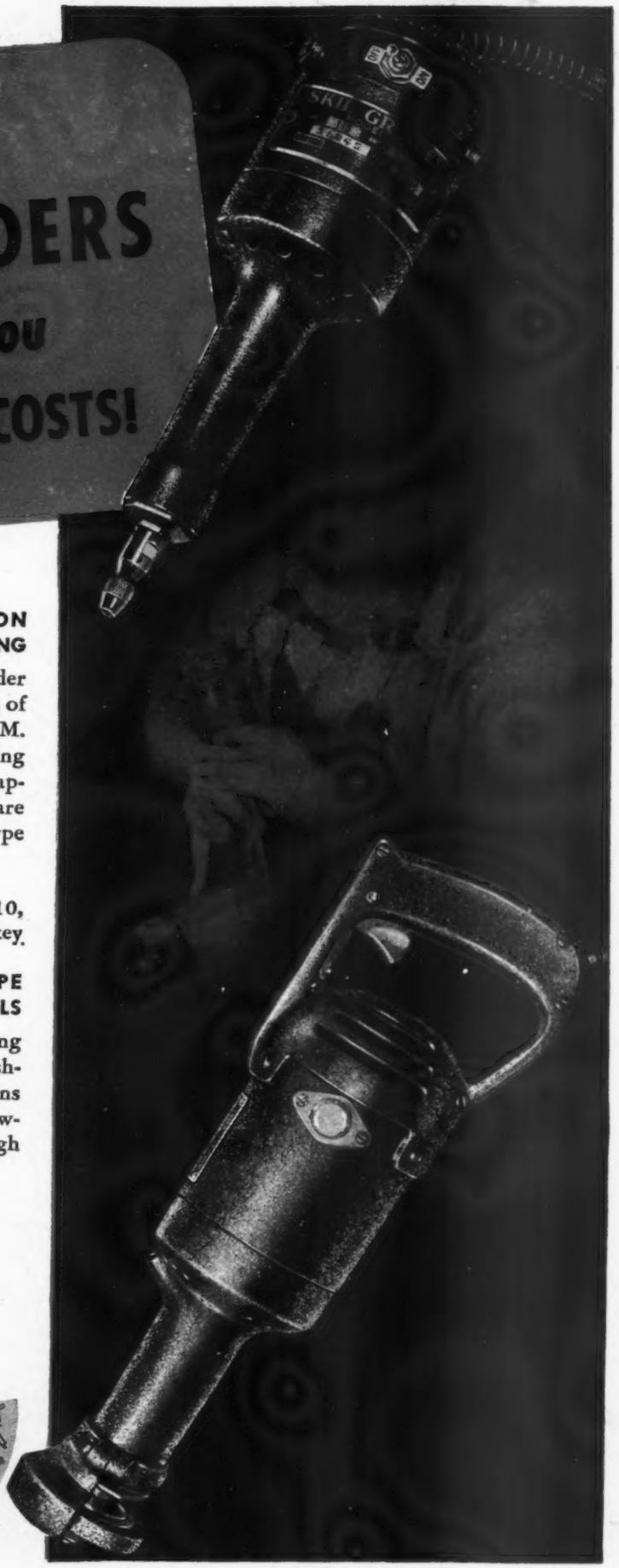
LIGHTFOOT'S SAFETY results from a combination of quality ingredients, a low pH index, and the "know-how" of more than 35 years of quality soapmaking.

Write for samples, or assistance on specific cleansing problems . . . no obligation, of course!

LIGHTFOOT SCHULTZ COMPANY
NEW YORK: 663 Fifth Avenue
CHICAGO: 43 East Ohio Street

Approved . . . BY LEADING PLANT MEDICAL AND SAFETY DEPARTMENTS

3 NEW SKILGRINDERS that'll help you CUT PRODUCTION COSTS!



MODEL 310 . . . HIGH SPEED PRECISION GRINDER FOR FINE, ACCURATE FINISHING

Here's a lightweight (less than 3 lbs.) grinder with double the power of average grinders of similar capacity . . . free speed of 22,000 R.P.M. . . . perfectly balanced for precision finishing of small openings, irregular molds or for lapping dies where both speed and accuracy are needed. Equipped with 1/8 in. cap. collet type chuck for a variety of grinding wheels.

MODEL 310C . . . Similar to Model 310, equipped with 1/8 in. cap. Jacobs chuck and key.

MODEL 311 . . . FAST SPINDLE TYPE GRINDER USES 7/8 IN. TO 2 1/2 IN. WHEELS

Power-packed, lightweight, smooth-running . . . just what you need for grinding and polishing larger irregular molds, castings and patterns . . . free speed of 15,500 R.P.M. . . . fully powered for tough finishing jobs...compact enough for working in tight places.

Ask Your Distributor About a Demonstration!

SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in All Principal Cities

PORTABLE ELECTRIC
SKILTOOLS
MADE BY SKILSAW, INC.

LOOK AT THIS NAME CAREFULLY!

TRADE MARK REGISTERED

KRANE KAR

THE ORIGINAL SWING-BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

KRANE KAR appeared 15 years ago . . . so original, so advanced in design, it made all contemporary Mobile Cranes obsolete! *KRANE KAR* provided, for the first time, stability without stabilizing devices, unobstructed vision, ease and safety of operation, unprecedented versatility and maneuverability.

For 10 years *KRANE KAR* was the only Mobile Crane of its type. The advent of the war stimulated the manufacture of similar Mobile Cranes. Outwardly these models resemble *KRANE KAR*. However, none has *all* the features that are built into *KRANE KAR* . . . features based on experience gained by building thousands for industry, railroads, utilities, municipalities. Without *all* these features no Mobile Crane can provide the efficiency, safety and economy of operation afforded by *KRANE KAR*.

WRITE FOR CATALOG #58

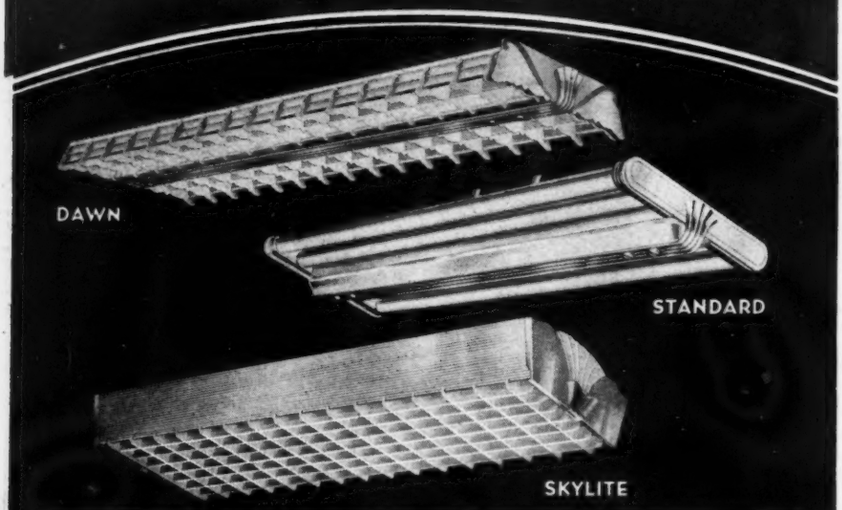
When you are buying a Mobile Crane, be sure it's a KRANE KAR

Silent Hoist & Crane Co.

855 63rd ST., BROOKLYN 20, NEW YORK

Smithcraft . . . THE FLUORESCENT

with *custom-made* quality and appearance



A Complete Line of Industrial and Commercial Fluorescents

Distributed exclusively through electrical wholesalers

Smithcraft **LIGHTING DIVISION**
Chelsea 50, Mass.

cal parts. Gives "straight line" temperature control without requiring coordination with other equipment. Can be used on electric furnaces, ovens, and injection molding machines employing standard millivoltmeter and potentiometer type controlling pyrometers, or gas-fired equipment using solenoid-controlled or motor-operated valves. Housed in a cast aluminum case, it is built for surface mounting installation. Claud S. Gordon Co., 3000 South Wallace St., Chicago 16.

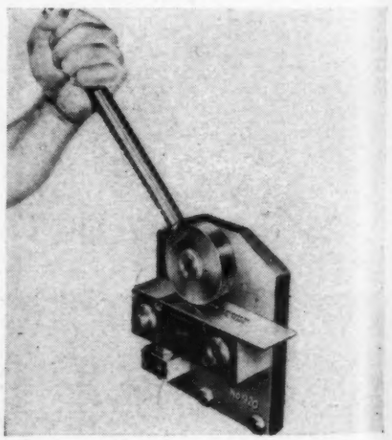
BOX TRUCK

Fiber box truck is claimed to be non-rusting and non-splintering, as well as highly maneuverable, because of its specially treated rubber wheels. Suitable for stockrooms and factories where

there are loads to carry from place to place in the plant, the truck features ribs reinforced with malleable iron corners, and a bottom of high-grade plywood or lumber. Federal Fibre Corp., 3704 Tenth St., Long Island City, N. Y.

MARKING MACHINE

Flat or round parts can be marked by machine constructed from a heavy gray iron casting having a steel stud at the top to carry a sleeve bearing mounted roller marking die. Hole in die accommodates the handle for rolling the mark into the flat part, which passes over a double row precision ball bearing held in the adjustable arm. The arm is hinged by a shaft through the frame at one end, and at the other end is bolted to frame



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With U.S. Industrial Tires you'll have no trouble finding the *right* tire for the job. That's because the "U.S." line is so *complete!*

And no matter *which* tire you choose you can be sure of top performance, maximum wear. That's because *all* these tires are built for *quality*.

To top it all, they're backed by the skilled, on-the-spot *service* of your local U. S. Tire Distributor. His name and address is in the phone book. Look him up—*today!*

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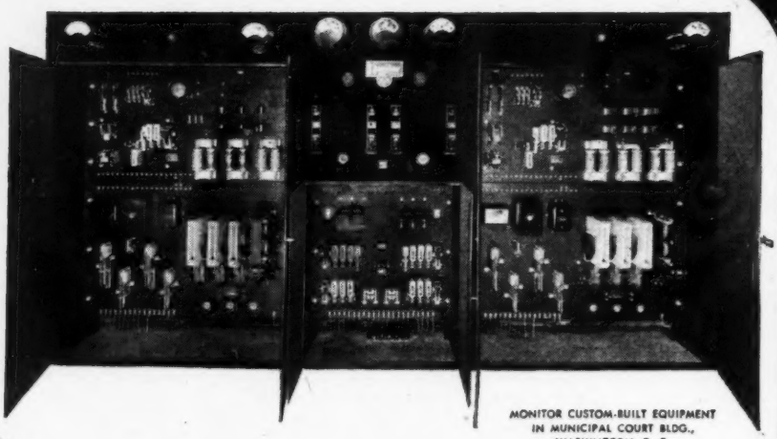
UNITED STATES RUBBER COMPANY

1230 AVENUE OF THE AMERICAS · ROCKEFELLER CENTER · NEW YORK 20, N. Y.

Our Specialty
CUSTOM-BUILT MOTOR CONTROLS



MONITOR CUSTOM-BUILT EQUIPMENT IN MUNICIPAL COURT BLDG., WASHINGTON, D. C.

Designed and Built to your Specifications

One of the newer structures in Washington is the Municipal Court Building. At time of construction, engineers set forth many unusual specifications and requirements for control of air-conditioning apparatus.

Because of its unique ability to design and build electric motor control equipment to exact customer specifications, Monitor got the job. Above you see the result—with all requirements met in a "more than satisfactory" manner.

For over 50 years Monitor has specialized in building *your* specifications and *your* requirements into specialized controls of all types, for all purposes—including printing presses, machine tools, synchronous motors, pumps, laundries, ventilating fans, dairies and many more.

So when you have an unusual control problem, be sure to consult your nearby Monitor Field Engineer. His service is prompt, efficient . . . and his specialized knowledge will save you time and money.

"If it's Custom-Built Monitor Builds it Better"

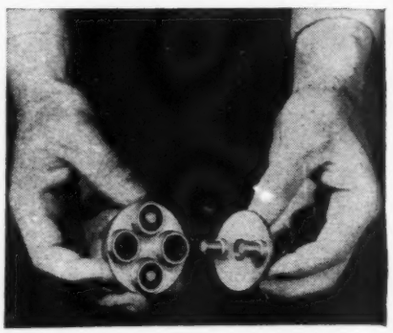
The Monitor Controller Company
BALTIMORE 2, MARYLAND

CANADIAN AFFILIATE • CANADIAN CONTROLLERS LTD • TORONTO, ONTARIO, CANADA

through an elongated hole or slot permitting adjustment. Screw and locknut, set beneath the locking bolt end of arm, provide adjustment. Machine can be used for marking scales used on machines, for trade-marking, and name and instruction marking. The Acromark Co., Morrell St., Elizabeth, N. J.

SMALL COUPLINGS

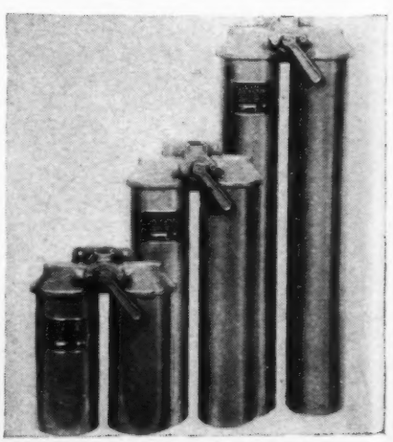
Designed for the low power take-off of fractional-horsepower drivers, small Morflex couplings are available in two sizes, handling 3- and 9-ft.-lb. torque The couplings weigh approximately ½ and 1¼ pounds. Maximum r.p.m. is 3600 for both sizes. The choice of stock bores ranges from ¼ on the smaller, to 1 inch



on the larger. Flexible neoprene biscuit assembly shields machine installations from shock and permits slight angular misalignment of shafts while transferring maximum power. Coupling is said to be unaffected by oil, dirt, or weather, and requires no lubrication. Morse Chain Co., 7601 Central Ave., Detroit.

FUEL OIL FILTERS

Three sizes of Hyflow duplex fuel oil filters can be bracket-mounted to diesel engines ranging from 200 to 10,000 horsepower. Duplex operation permits an uninterrupted flow of fuel to the engine. By turning the valve control handle, the flow of oil is directed from one side of the filter to the other. Filters feature made-up type throw-away filter cartridges, metal covered, with gaskets attached, eliminating loose parts. The



The CONE AUTOMATIC MACHINE COMPANY

sees many

GOOD THINGS AHEAD

It is reported that . . . . . .

Amplex Division of Chrysler Corp. proposes an industry-wide study to standardize bearing sizes.

get ready with CONE for tomorrow

Dow Corning Corporation has a new white enamel made of silicone resins that approaches baked enamel in its resistance to heat.

get ready with CONE for tomorrow

Bell Telephone Laboratory engineers have demonstrated a "tone synthesizer" that can imitate the sound of any musical instrument.

get ready with CONE for tomorrow

Raytheon Mfg. Co. has a compact, rugged radar set for installation on merchant vessels.

get ready with CONE for tomorrow

An instrument called a "metal Sorter", made by Control Equipment Co. of Pittsburgh, identifies unknown metals by measuring the electricity they develop when rubbed by a known sample.

get ready with CONE for tomorrow

"Liquid Honing", a method of finishing metal surfaces with a spray of emulsion containing an abrasive as fine as 2,500 mesh, is being promoted by Vapor Blast Mfg. Co. of Milwaukee.

get ready with CONE for tomorrow

American Steel and Wire Co. has a nail that can be driven into steel with a hammer.

get ready with CONE for tomorrow

Plastics can now be dip-dyed at room temperature with solutions perfected by International Printing Ink. The color becomes integral, and the physical properties of the plastic are not changed.

get ready with CONE for tomorrow

Oil Well Chemical Service Company of Fort Worth has succeeded, with the help of Monsanto, in sealing oil wells as deep as 11,500 feet with a liquid resin that permeates rock and holds back unwanted natural gas.

A new combination tapping and threading attachment is now available for a leading line of six spindle automatics. The unit has a wide, selective, threading range; it can be mounted in any one or a number of endworking positions, as required, and it can be readily installed or changed over. A deseriptive booklet is available.

get ready with CONE for tomorrow

Gulf Oil has an additive said to prevent foaming in lubricating oils.

get ready with CONE for tomorrow

University of California scientists have produced a standard for the measurement of length ten times as accurate as the cadmium light ray now accepted by using a light wave from transmuted mercury (made from gold) excited by a high frequency radio beam.

The Army and Navy are studying our natural caves, such as Carlsbad and Mammoth, in order to determine their usefulness as war-time shelters for industry.

get ready with CONE for tomorrow

Union Oil Co. has "Uniperox", a peroxide made from petroleum for use as a jet plane fuel, to improve diesel fuel oil and as a catalyst in the making of plastics.

get ready with CONE for tomorrow

The Ford Motor Company has announced its intention of erecting a $50 million laboratory for automotive research and engineering.

get ready with CONE for tomorrow

"Palestic" is a treatment for plaster which makes it as hard and strong as stone and also makes it adhere to plastics, metal or glass.

get ready with CONE for tomorrow

Tennessee Eastman claims that its Tenite plastic pellets blown from an ordinary blasting machine put a fine finish on aluminum castings.

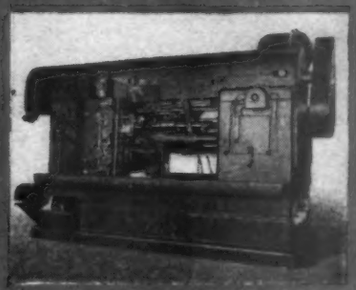
FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

A TON of Chips every 15 hours

Every 15 hours a 5" 4-spindle Conomatic removes a ton of chips from SAE X-1315 bar stock to produce this piece within the time and tolerances required.

***You* can be ahead with a Conomatic.**

Ask your CONE *representative to show you our new color motion picture*



CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

33

Bond General Purpose Truck

For warehouse, shipping room, loading platform—anywhere in the plant. Wheels, set inside frame, turn freely—won't catch on bags or other obstacles. Round, cold rolled steel axle easily replaced. Parallel sides add efficiency to handling of cases and barrels.

Materials flow smoothly, safely, efficiently on these Bond handtrucks. Each of this husky trio rolls easily...withstands hard usage. Bond's long experience as specialists in materials handling equipment is your guarantee of dependability.

Write today for additional information on these trucks.

BOND FOUNDRY & MACHINE CO., MANHEIM, PA.

Bond Keg and Case Trucks

Two sturdy, well-constructed trucks at an unusually low price. Both made of 1-inch square high-carbon steel tubing. Can be equipped with plain or roller bearing semi-steel or rubber tread wheels.

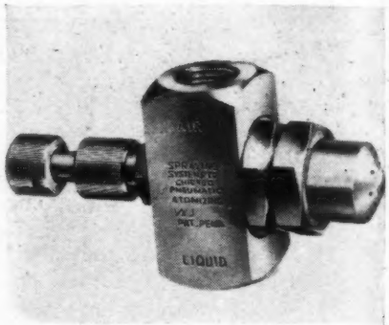
No. 4691—The Truck with a Thousand Uses

No. 4692—With Steel Guards for Handling Bags

filtering material is a cellulose of uniform density, packed to avoid channeling. Suitable for filtering light and heavy fuel oil, the units offer micronic filtering. The Hilliard Corp., 102 West 4th St., Elmira, N. Y.

PNEUMATIC NOZZLE

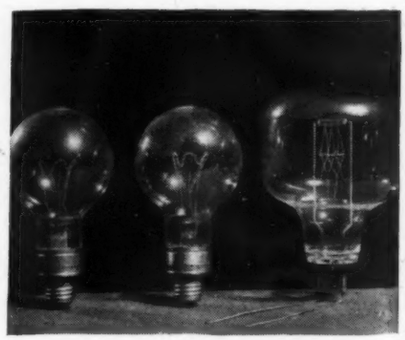
Atomizing nozzle for ½-in. pipe connections is built to operate with compressed air, although other gases or steam can be used. Capacities of 20, 40, or 60 g.p.h. are obtainable. Nozzles are of the in-



ternal mixing type, made of brass or stainless steel, and are available with or without shutoff needle. Spraying Systems Company, 4021-D West Lake St., Chicago 24.

INFRA-RED LAMPS

Infra-red industrial lamps are made in 250-, 375-, and 500-watt sizes. The two smaller lamps, each with a G30 bulb, for use in open reflector ovens, are interchangeable. Each has a medium skirted



base and 5-in. light center length to fit infra-red reflectors in use. The 500-watt lamp is equipped with a medium bipost base and 6-in. flexible leads. Its T-40 bulb is made of hard glass. General Electric Lamp Dept., Nela Park, Cleveland.

VIBRATION METER

Vest-pocket-size Reed Vibrometer, weighing 5 ounces, measures machine vibrations and compares amplitudes. Its range is from 450 to 50,000 cycles per minute, and it operates on the tuned reed

One Man--- One Minute...

Thats All it Takes to Bleed Wagner Hydraulic Industrial Braking Systems

Remote-control bleeding is the latest improvement in Wagner hydraulic braking systems for overhead traveling cranes and other industrial equipment. Controlled from the crane cab, the bleeder enables the operator to remove air from the fluid lines whenever necessary, simply by pressing a pushbutton and pumping the control cylinder foot pedal.

Other Advantages of the Remote-Control Bleeder:

1. One man can quickly bleed system.

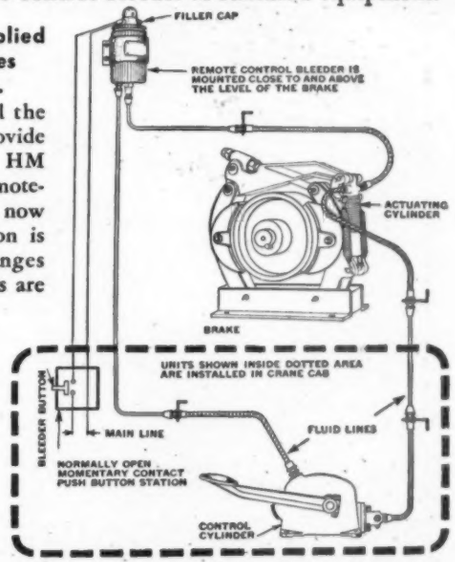
2. Maximum braking efficiency is constantly maintained by keeping lines full of fluid at all times.

3. Circulatory bleeding results in a saving of fluid, since none is lost during the bleeding operation.

4. Brake can be installed at a considerable height above the control cylinder—an important factor in successful ladle crane applications.

All current Wagner Hydraulic crane-bridge braking systems include the remote-control bleeder as standard equipment.

Can Be Easily Applied to Wagner Brakes Now In Service.
Kits containing all the parts needed to provide type H and type HM brakes with the remote-control bleeder are now available. Installation is simple, as no changes in the basic systems are necessary.


FILLER CAP
REMOTE CONTROL BLEEDER IS MOUNTED CLOSE TO AND ABOVE THE LEVEL OF THE BRAKE
ACTUATING CYLINDER
BRAKE
UNITS SHOWN INSIDE DOTTED AREA ARE INSTALLED IN CRANE CAB
BLEEDER BUTTON
MAIN LINE
FLUID LINES
NORMALLY OPEN MOMENTARY CONTACT PUSH BUTTON STATION
CONTROL CYLINDER

In addition to these important features furnished by the remote-control bleeder, Wagner hydraulic industrial brakes offer many other advantages, discussed in Bulletin IU-186. Send for a copy today, addressing your request to Wagner Electric Corporation, 6412 Plymouth Avenue, St. Louis 14, Mo.

Consult Wagner Engineers on all Industrial Braking Problems

Wagner Electric

LOCKHEED HYDRAULIC BRAKE PARTS and FLUID... NoRol... CoMaX BRAKE LINING

AIR BRAKES... TACHOGRAPHS... INDUSTRIAL BRAKES... ELECTRIC MOTORS... TRANSFORMERS

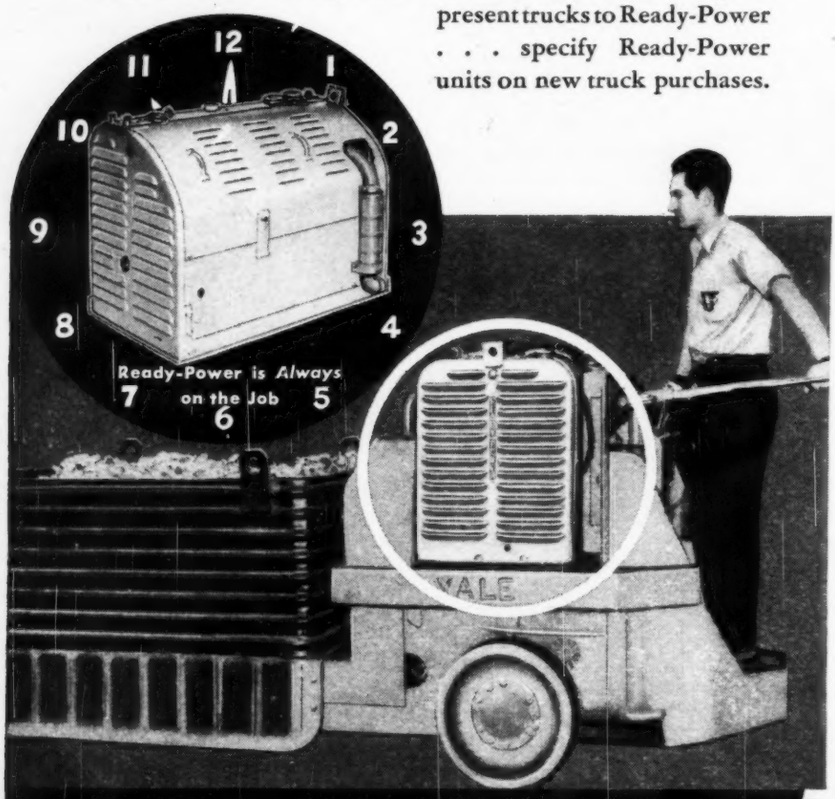
146-A

Sales and Service Branches: ATLANTA 3 • BALTIMORE 18 • BOSTON 15 • BUFFALO 8 • CHICAGO 16 • CINCINNATI 10 • CLEVELAND 15 • DALLAS 1 • DENVER 2 • DETROIT 2 • HOUSTON 2 • INDIANAPOLIS 4 • KANSAS CITY 8 • LOS ANGELES 15 • MEMPHIS 3 • MILWAUKEE 2 • MINNEAPOLIS 4 • NEW YORK 7 • OMAHA 2 • PHILADELPHIA 8 • PITTSBURGH 13 • PORTLAND 9 • ST. LOUIS 3 • SALT LAKE CITY 1 • SAN FRANCISCO 3 • SEATTLE 4 • SYRACUSE 2 • TULSA 3 • WASHINGTON 5
In Canada: WAGNER ELECTRIC AT LEASIDE, ONTARIO

Electric Truck Operation Made Even MORE Efficient

READY-POWER Gas-Electric Units Generate Electric Power Right on the Truck Chassis

Electric trucks are "ahead of the field" in effective materials-handling. Ready-Power Units (in place of batteries) on electric trucks will substantially improve their performance. These units generate an unlimited amount of electric power right on the truck chassis thereby making smooth, top speed performance available *every hour of the day.* This means more work accomplished per man-hour . . . greater economy . . . more all around satisfaction. Ready-Power Units, for any type of job, can be installed on any make of electric truck. Convert your present trucks to Ready-Power . . . specify Ready-Power units on new truck purchases.



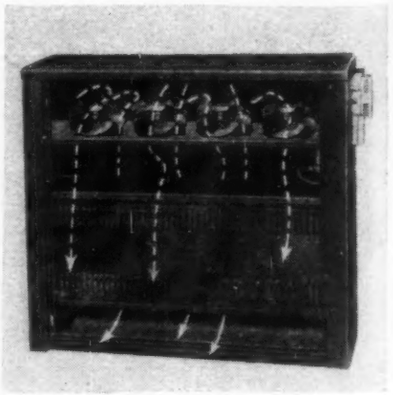
THE READY-POWER CO.

3820 Grand River Ave., Detroit 8, Michigan

principle. Machine vibration of 0.001 inch produces a reed vibration of approximately ½ inch. Vibration frequency in cycles per minute is read from a graduated dial. Where there are several disturbing frequencies or vibrations are of complex wave form, the instrument picks out each frequency separately, and evaluates its comparative amplitude. Upper end of scale can be used for noise analysis. The Vibroscope Co., 6 East 39th St., New York 16.

AIR CONDITIONING UNIT

Coping primarily with latent heat, air conditioning unit is engineered to remove moisture from the air without overcooling. Self-adjusting, the unit permits cooling on hot, dry days, and removal of moisture on cool, humid days. Small condensing unit requires minimum

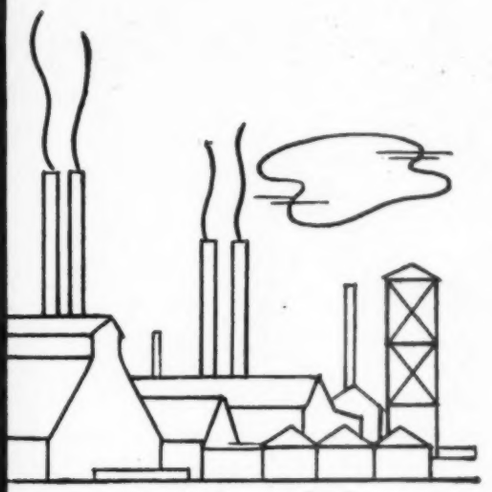


horsepower, because principle employed eliminates need for lowering air to the dew point to effect moisture removal. Named Comfortaire Conditioner, it is available in two floor models. American Coils Co., 25-27 Lexington St., Newark 5, N. J.

CURRENT TRANSFORMERS

Two current transformers for meter, relay, and control applications are announced. The JKL-3 is rated 5000 volts, 1200 to 4000 amperes, and is said to withstand full-wave impulse tests at 60 kv. The JKL-4 is rated 8700 volts, 1200 to 4000 amperes, and is built to withstand

Meet the Man who spends the Money ...the P.A.



IT'S his duty to know whom to contact for countless items . . . his worry what to do about the promise someone didn't keep . . . his "headache" how to combat the often insistent demands of his sales department for "reciprocity" . . . his task to get around today's shortages. Yes, these and scores of other problems constantly beset the busy P.A.

He is a mentally alert, highly trained, efficient individual, with technical "know-how" and a wide understanding of human nature. His keen sense of values serves him well in buying for his company the needed material with the greatest economy.

It is significant therefore, that over the years, wide-awake, progressive purchasing agents have learned to call on Levinson Steel for dependable Warehouse and Fabricated Steel Products.

LEVINSON STEEL

THE LEVINSON STEEL COMPANY

PITTSBURGH

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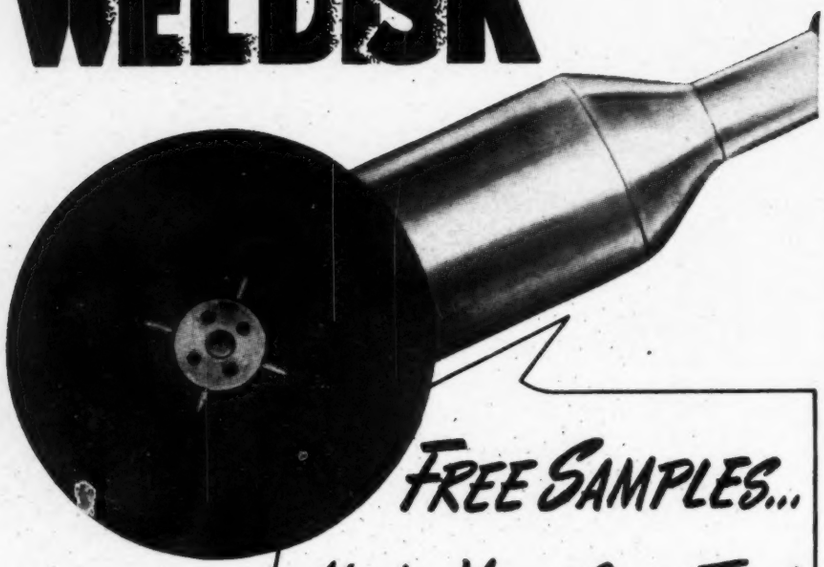
WELDISK



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See for yourself HOW WELDISKS

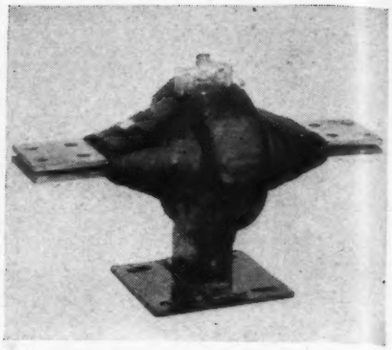
Increase Grinding Speeds

Decrease Grinding Costs

Don't take our word for it. Prove to your own satisfaction that WELDISKS are unmatched in performance on high-speed pneumatic grinders as well as on any portable electric grinder . . . and that they last longer and reduce costs. The superiority of WELDISKS over ordinary disks is due to their amazing cold-setting cement (a scientific formula – not glue or resin) that actually improves with age . . . and to their laminated backing of fibre for stiffness and cloth for strength . . . You can tell by your own test that WELDISKS are better disks. Write for a free sample. State size of disk, grade of grit, and brief description of work to be done. WELDISK will be sent promptly without obligation.

Abrasive Products, Inc.

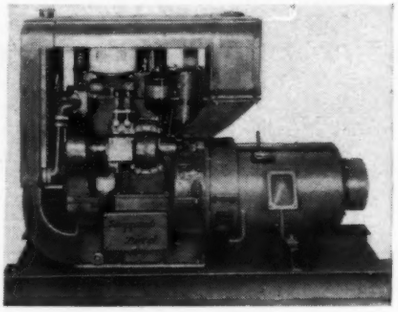
SOUTH BRAINTREE 85, MASSACHUSETTS · MAKERS OF JEWEL COATED ABRASIVES



full-wave impulse tests at 75 kv. Both the JKL-3 for 2400- and 4800-volt lines and the JKL-4 for 7200-volt lines are designed for accurate metering over the normal current range up to 100 percent of rating, and also for relay operation up to 20 times rated current. Meter & Instrument Div., General Electric Co., Schenectady 5.

GENERATORS

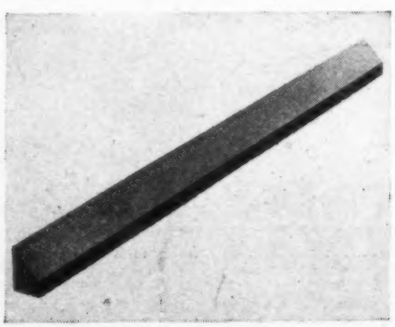
Constant, steady power line quality voltage, without the use of accessory regulating equipment, is claimed to be available with diesel a.c. generating sets of 5- to 15-kv. capacity. The "Regulectric" system, utilizing a built-in circuit, has no moving parts. Factory set,



it requires no attention while in operation. Sensitive to small changes in generator voltage, it maintains a normal variation of plus or minus 2 percent from no load to full load. Generating sets operating and functioning in a similar manner are available up to 36 kw. R. H. Sheppard Co., Hanover, Pa.

ANGULAR STRAIGHT EDGE

Made of heat-treated Meehanite ranging in size from 18 to 84 inches long, with



GRAPHITE GUS SAYS:

GRAPHITE the "HOT SPOTS"

and you'll have no lubrication problem

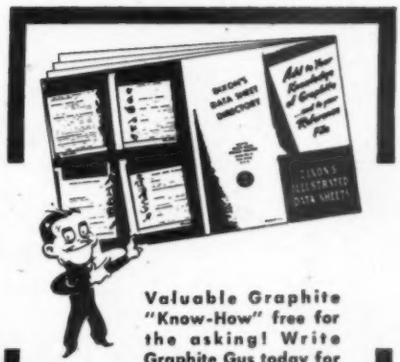
Dixon's Graphited Greases and Oils handle excessive heats, pressures and speeds ordinary lubricants can't cope with

Dixon's Cup & Pressure Gun Graphited Grease. This all-purpose water-insoluble lubricating grease does a super lubricating job under all conditions of extreme heats and pressures. Why? Because the lubricating flake graphite in it coats metallic surfaces into sleek frictionless surfaces that resist wear. Data sheet #13 tells "where and how".

Dixon's L & P (Lubricating and Penetrating) Graphited Oil. A long-lasting oil combining exceptional qualities. It gets in where ordinary oils can't. It deposits a tough, oily graphite film to fight-off friction. Lubricating flake graphite fortifies it for extreme heat conditions. Also works fast in loosening rust-tight assemblies. Data sheet #16 "tells all".

Dixon's Auto-Marine Packing and Cup Graphited Grease. A heavy-bodied bearing packing grease of maximum stability under extremes of both heat and cold. Will not thin down, wash out, or emulsify in fresh or salt water. Graphite gives it a stamina that ordinary greases can't equal. Data sheet #17 gives details.

Dixon's Graphite SlipStik. This little 3-inch cylinder has 1001 uses throughout plant, office, home,—wherever quick, handy rub-on lubrication is needed. Won't leak out or gum up. Data sheet #25 tells about it—but, why not stop in at your supply or hardware store and pick up one—15¢



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You will likely be amazed to also learn what the Complete Line of Dixon's Graphite Products has done for others, and can do for you.

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JOSEPH DIXON CRUCIBLE COMPANY

DIV. 44C10 — JERSEY CITY 3, NEW JERSEY

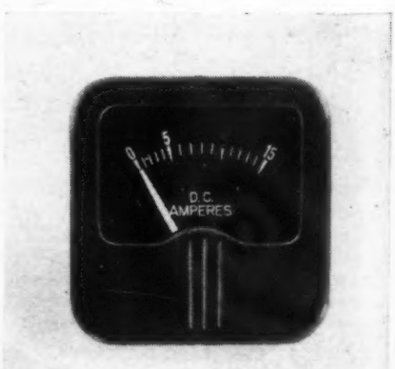
any angle specified, angular straight edge is now on the market. Two faces are hand scraped. Suitable for machine builders, and for machine rebuilding or repair work to simplify the task of scraping and checking machine ways and slides, it can be used with or without handles at each end. Machine Products Corp., 6777 East McNichols Road, Detroit 12.

TREATED CORDAGE

White Koroseal-cordage is made with 19 strands of low-stretch cord rayon with tensile strength of 150 to 200 pounds. It is non-kinking and non-twisting, wipes clean with damp cloth, is not necessary to take down, and has maximum resistance to abrasion. Manufacturer claims there is no reduction in tensile strength after a 200-hour water spray and weathering test at 125 deg. F., no significant change in characteristics after an oven test at 48 deg. F. for 48 hours, slight shrinkage in water boiling test of 24 hours. It withstands sub-zero weather if not abruptly kinked, ties and knots same as cotton cord, and jacket withstands clinching or bending pressure with all types of hooks or fasteners. Merchandised in 50-ft. hanks with 12 hanks to a box, 12 boxes to a shipping section. Hanks are continuous and connected. The B. F. Goodrich Co., Akron, Ohio.

AMMETERS AND VOLTMETERS

Line of d.c. moving vane type ammeters and voltmeters features long, easy-to-read scales. Pointer oscillation is reduced by the high torque lightweight movement. Sharply defined numerals and graduations are lithographed on the warp-proof color-fast



metal dials, either with black characters on a white background, or with white characters on a black background. Dials have a scale length of 80 degrees of arc on the center zero type scale, and 60 degrees on the zero off-center scales. United States Gauge Div., American Machine & Metals, Inc., Sellersville, Pa.

ALL STAINLESS STEEL (18-8) CONSTRUCTION MAKES TAYLOR ACCURATUS* THERMAL SYSTEMS

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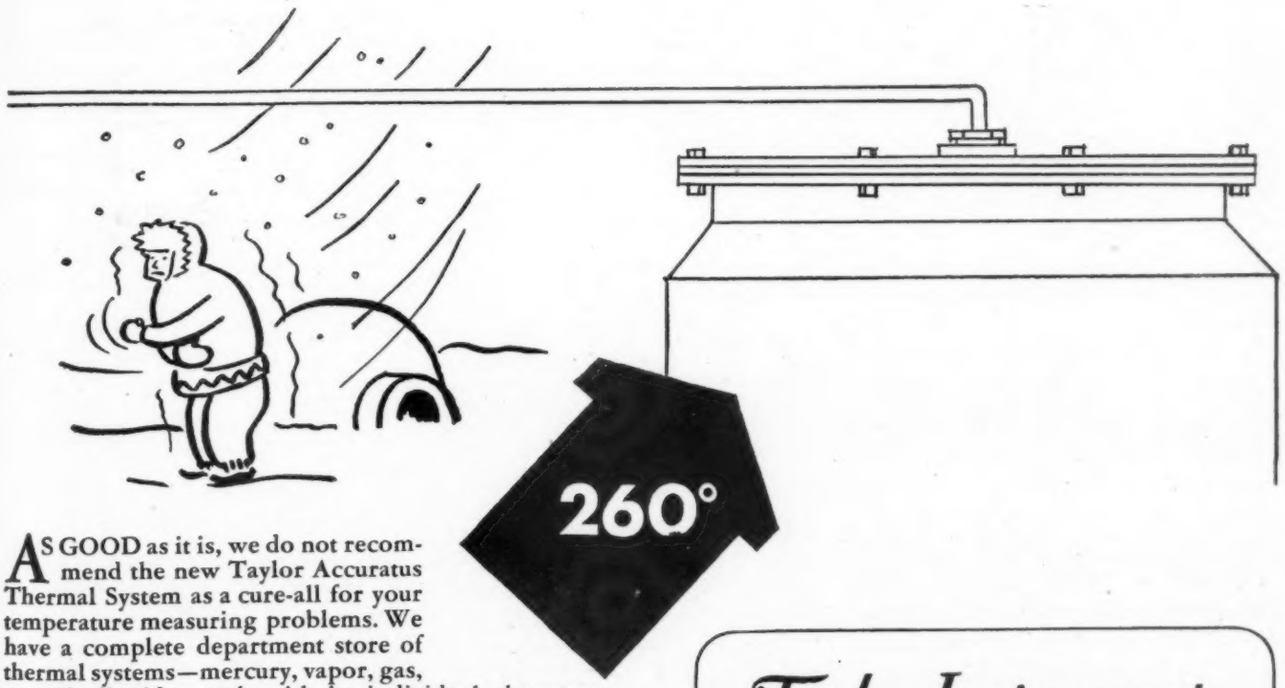

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▾ ▾ ▾

Moral: Let Taylor help you solve your temperature problems. Call your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

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Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

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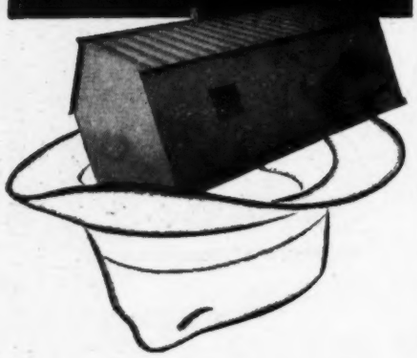

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They can be taken down and readily moved from one location to another. Erection is quick. Even an inexperienced crew of four men can assemble a 12′ x 24′ structure in approximately 10 hours.

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Letters to the addresses given will bring you further information.

TRAINING PROBLEMS faced by management are discussed in periodic bulletins. Single copies, 25c. Training Within Industry Foundation, 382 Springfield Ave., Summit, N. J.

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AVAILABLE SURPLUS PROPERTY, specifications, prices, and how to buy are told in WAA's "Surplus Reporter." Hardware, plumbing, heating, air conditioning, and electrical offerings listed in issue No. 15. Single copies free. Write Trade Paper Section, Office of Information, War Assets Administration, 70 Pine St., New York.

DESK TRAYS have swivel-mounted top basket to permit easy access to lower tray. Plastic construction. Art Steel

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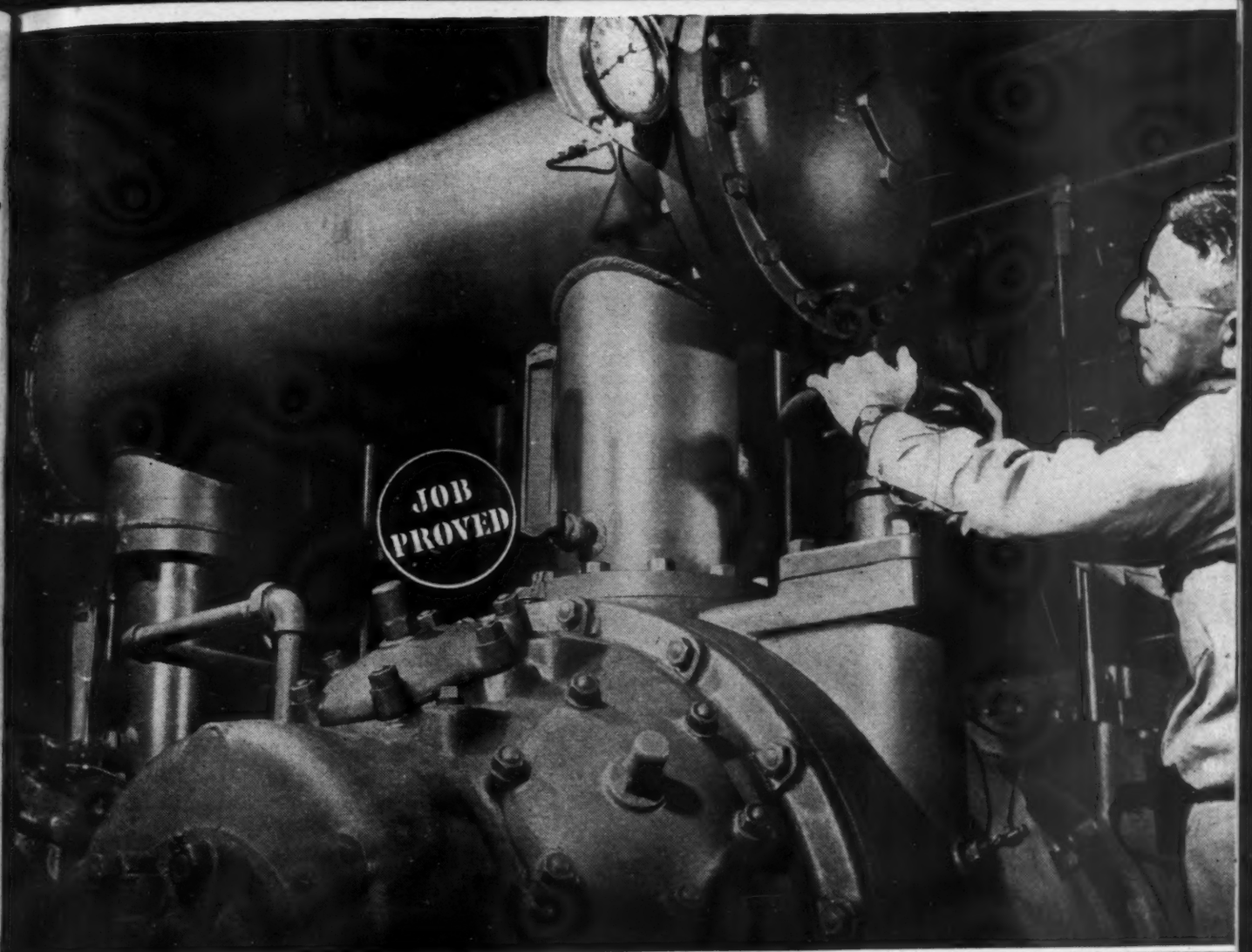

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For the vital equipment on your production line, in your power plant, or in your machine shop, pick the "Job-Proved" Sun lubricants that will insure low-cost, trouble-free production. Call the nearest Sun office today for information on Sun's full line of quality lubricants.

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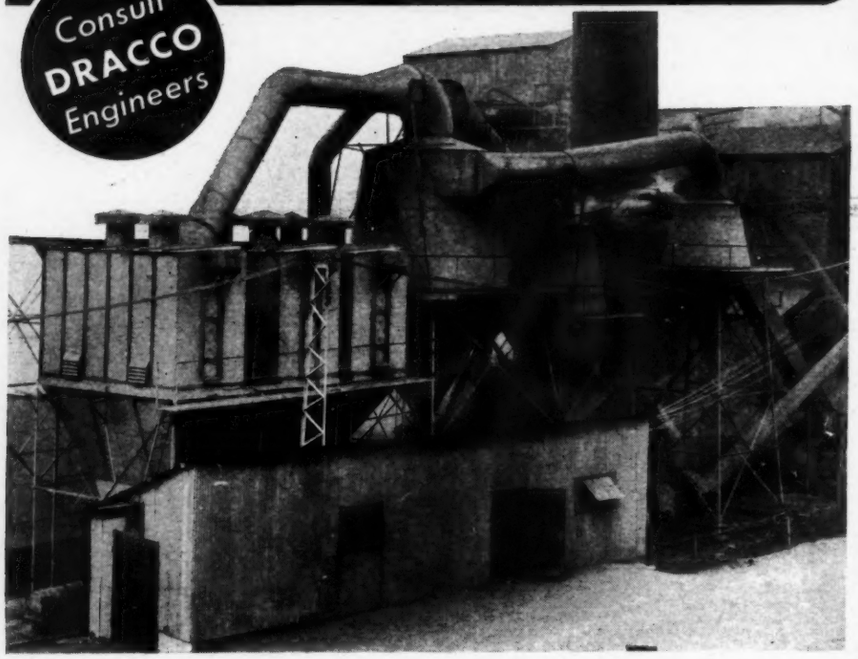

It pays to control dust even if the amount is small. For dust is ALWAYS an expense, damaging bearings, causing excess wear of working parts, and slowing down production. Remember . . . dust ALWAYS causes a loss, and DRACCO Dust Control ALWAYS saves money. There is no place for dust in any efficiently operated plant. Why not discuss your dust problems with DRACCO Engineers. Their recommendations . . . based on thirty years of experience in dust and fume control . . . may lead to considerable savings in your plant.

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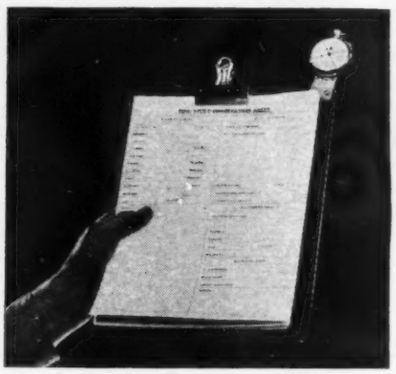

TIME STUDY BOARD of transparent plastic has stop-watch holder attached. Can be adapted to hold securely any standard timer. Also for left-handed use. A. J. McDonald, 2248 North Avers Ave., Chicago 44

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Making Steam Trap History, 16-mm color-sound film depicts industrial applications, installation, and maintenance of steam traps. Distributed by Hathen Productions, 264 S. VanPelt St., Philadelphia 3.

You're the Doctor, 35-mm slide film, instructs mechanics in proper front-end alignment and maintenance of automobiles and trucks. Recorded sound. Automotive Div. of Bear Manufacturing Co., Rock Island, Ill.

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Everyday Miracles, 16-mm sound film, depicts industrial applications of Carboloy cemented carbide. Write to Modern Talking Picture Service, 9 Rockefeller Plaza, New York.

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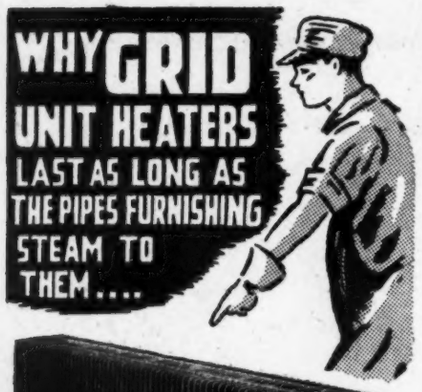

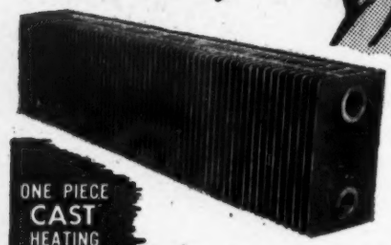

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★ WITHSTANDS STEAM PRESSURES UP TO 250 LBS.

★ WITHSTANDS HIGH CORROSIVE ATMOSPHERES

★ One Piece construction heating sections (patented) of high test cast iron that withstand steam pressures up to 250 lbs.

★ No soldered, brazed, welded or expanded connections to become loose or develop leaks.

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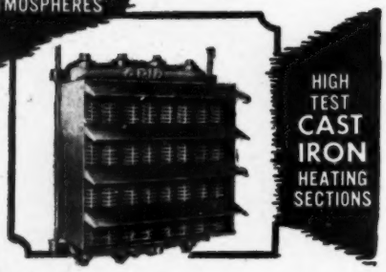

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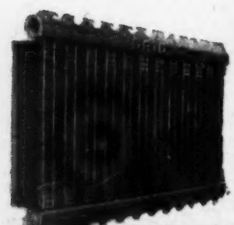

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BENJAMIN WERNE, Lecturer in Government Regulations, New York University, and a Member of the New York Bar

Period Surveyed: August 1 to September 1

TREND INDICATORS—

Veteran's Rights

REINSTATEMENT ORDERED

A federal district court recently awarded a veteran salesman the right to reemployment in the territory covered by him prior to his entrance into the armed forces. His previous employer offered him reemployment in a less profitable territory, whereupon the veteran brought his case to court. Upon finding that the employer never had made a practice of rotating salesmen from one territory to another, and that his refusal to reinstate the veteran in his former territory was not predicated upon any business exigency, the court held that the veteran was wrongfully denied reinstatement to his former position or one of "like pay." (Winter v. Atlas-Baker Manufacturing Company, USDC N. Iowa)

COMPENSATION ORDERED TO MISPLACED EMPLOYEE

According to recent arbitrator's decision, employees who were displaced by veterans with less seniority are entitled to have made whole such losses incurred when their contract rights were denied them. Although the employer acted in good faith and gave preference to the veteran in accordance with the "superseniority" doctrine later invalidated by the U. S. Supreme Court, the arbitrator maintained that the displaced employee was entitled, according to the seniority provisions of the prevailing contract, to be compensated for earnings lost when denied these contractual rights. (In re arbitration between Lee Rubber & Tire Company and United Rubber Workers)

NO CHANGE IN CIRCUMSTANCES

The fact that the present incumbent of the job has proved more satisfactory than the veteran who previously held the position does not change the employer's circumstances so as to relieve him of his statutory obligation to rehire the veteran. In the particular case, the veteran had previously held the position of manager in a women's apparel shop, in which job he received $50 a week. A woman was hired to succeed him at $55 a week. Upon his return the veteran was reemployed as floor manager, a job in which he did not perform his original duties nor have the right of access to the firm's records. The employer contended that the veteran was planning to run a competitive business and was, therefore, deprived of access to the records of the firm. The court held that it would not recognize such argument, that, although the veteran did not at first return to his job, his statutory rights were not impaired as long as he applied for reinstatement within the 90-day period. The court awarded the veteran the right to his original job at the increased salary of $55 a week. (Troy v. Mohawk Shop, USDC M. Pa.)

Reinstatement rights were awarded a veteran to her former job as receptionist and switchboard operator in a nationwide hotel chain composed of affiliated corporations, although the functions of her job were transferred from one affiliated corporation to another. The court held that without any other change in the conduct, composition, ownership, or control of such office, there was not a change in the employer's circumstances making it impossible or unreasonable to restore the employee-veteran to her former position. (Sullivan v. Milner Hotels, USDC E. Mich.)

CHANGE IN CIRCUMSTANCES

An employer's offer to reinstate a salesman veteran in a different territory from the one in which he originally worked was considered by a federal district court to be valid, since the employer's circumstances had been so changed as to preclude the veteran's reemployment in his original territory. During the veteran's absence, the employer reduced the number of lines of products sold from six to one, and reduced the extent of all salesmen's territories. Upon application for reinstatement the company offered to place the veteran in another territory in which his earnings would equal those he made in his original job. Although other salesmen were working for the company in the veteran's original territory, the court held that reinstatement in that particular territory was not required because of the employer's "changed circumstances." (Levine v. Berman, USDC N. Ill.)

An employer's refusal to reinstate a returned veteran was upheld by a federal district court where the company's circumstances were so changed as to constitute sufficient reason for denying reemployment. The veteran before his

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A COMPLETE *Automatic Switch Control*

That's because the *Feather-Touch* Safety Switch on the *Finnell* Motor-Weighted Floor-Maintenance Machine operates on *both* sides of the handle. In other words, the switch works with either hand from either side of the handle! The moment the operator releases his grasp, the switch automatically disengages and the machine stops. *Feather-Touch* characterizes the ease with which the switch is held to 'on' position.

This *600 Series Finnell* is self-propelled . . . glides over the floor with virtually the effortless guidance of the operator. Horizontally-mounted motor and correct distribution of weight, affording truly balanced operation, also contribute to the greater handling ease of the *Finnell* Motor-Weighted-Machine. Mounts a G. E. Drip-Proof Capacitor Motor . . . is equipped with Timken Bearings. And the ruggedly constructed worm drive, housed in an extra-capacity leak-proof gear case that is lubricated for 2500 hours, assures smooth, noiseless performance. Rubber handle grips are perfectly insulated. A precision product throughout, reflecting *Finnell's* four decades of specialized experience in the manufacture of floor-maintenance equipment.

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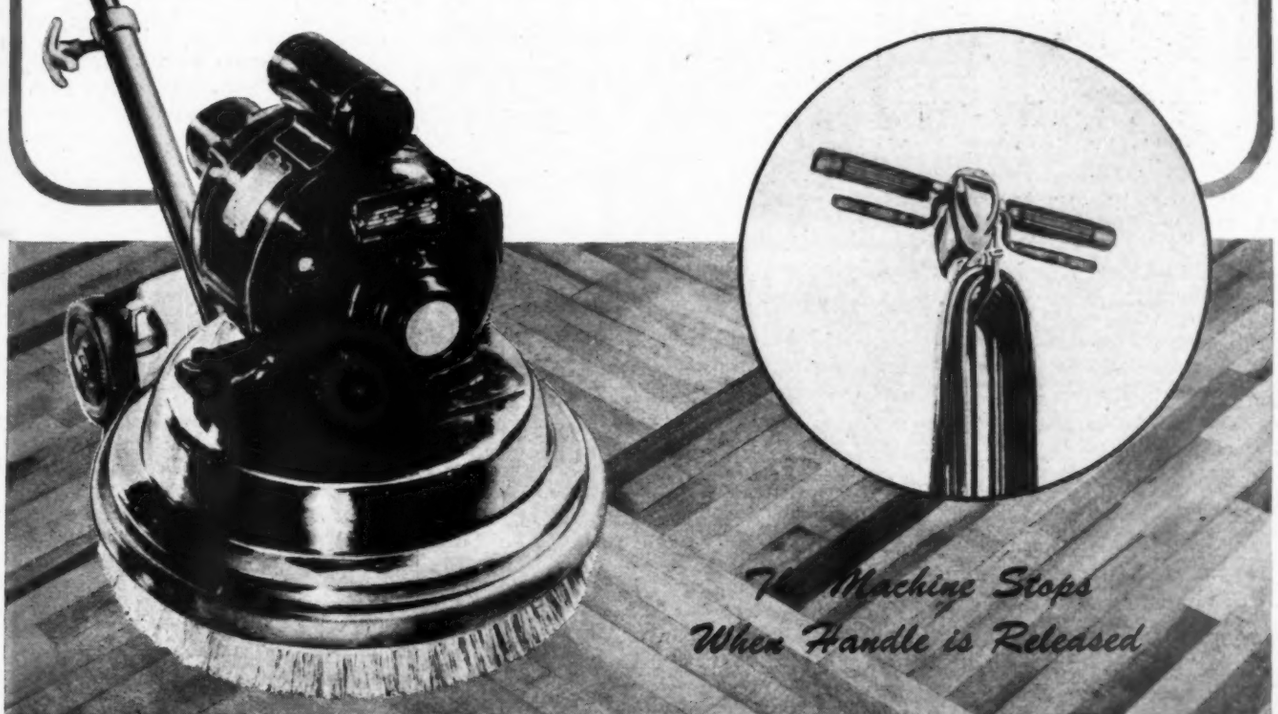
For consultation or literature, phone or write nearest *Finnell* branch or Finnell System, Inc., 2510 East Street, Elkhart, Indiana. Canadian Office: Ottawa, Ontario.



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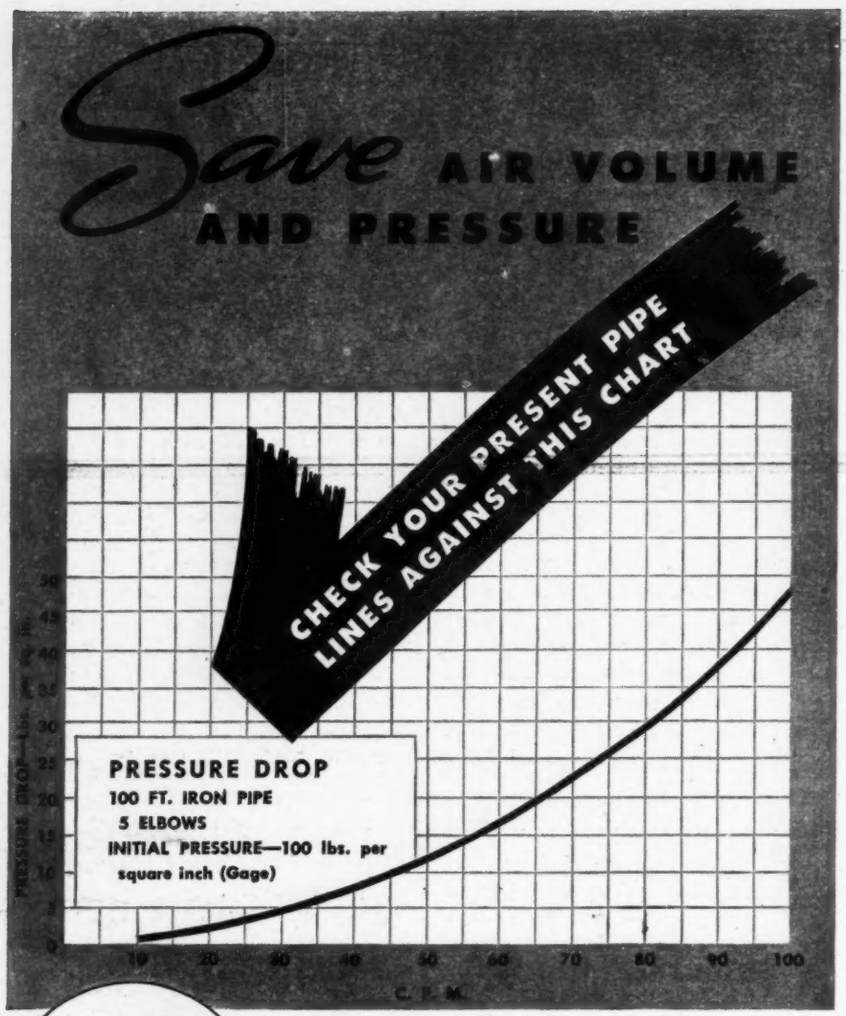
Save AIR VOLUME AND PRESSURE
CHECK YOUR PRESENT PIPE LINES AGAINST THIS CHART
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100 FT. IRON PIPE
5 ELBOWS
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PRESSURE DROP—LBS.
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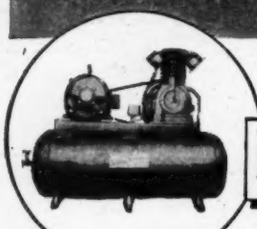

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Friction, alone, in long pipe lines costs money in lost air volume and pressure. Did you ever check the length of your air lines from the central compressor to the work to be done? The above chart shows over 40% loss of air pressure in only 100 feet of ½" pipe, with five elbows in the line! Why pay to produce air that is wasted? With KELLOGG-AMERICAN "On-the-Spot" Air, long pipe lines are eliminated... loss of air volume and pressure is decreased to a minimum. Get the facts about efficient, economical utilization of compressed air power.

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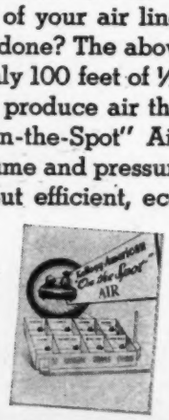


AMERICAN Brake Shoe COMPANY

KELLOGG DIVISION

induction had held the position of chief physician and executive in charge of administering the workmen's compensation insurance program. During the period of his military service, the ownership of the company changed hands and a new type of insurance plan was adopted under which examinations of the employees were performed by the insurance company. The welfare director was entrusted with the administrative work previously performed by the veteran.

The court was of the opinion that the change effected by the new owners was carried out in good faith and that the company's circumstances were so changed as to make it unreasonable to compel the company to reemploy the veteran in a position the principal duties of which had completely disappeared. (Featherstone v. Jersey Power Company, USDC N. J.)

SENIORITY RIGHTS TO HIGHER JOB ORDERED

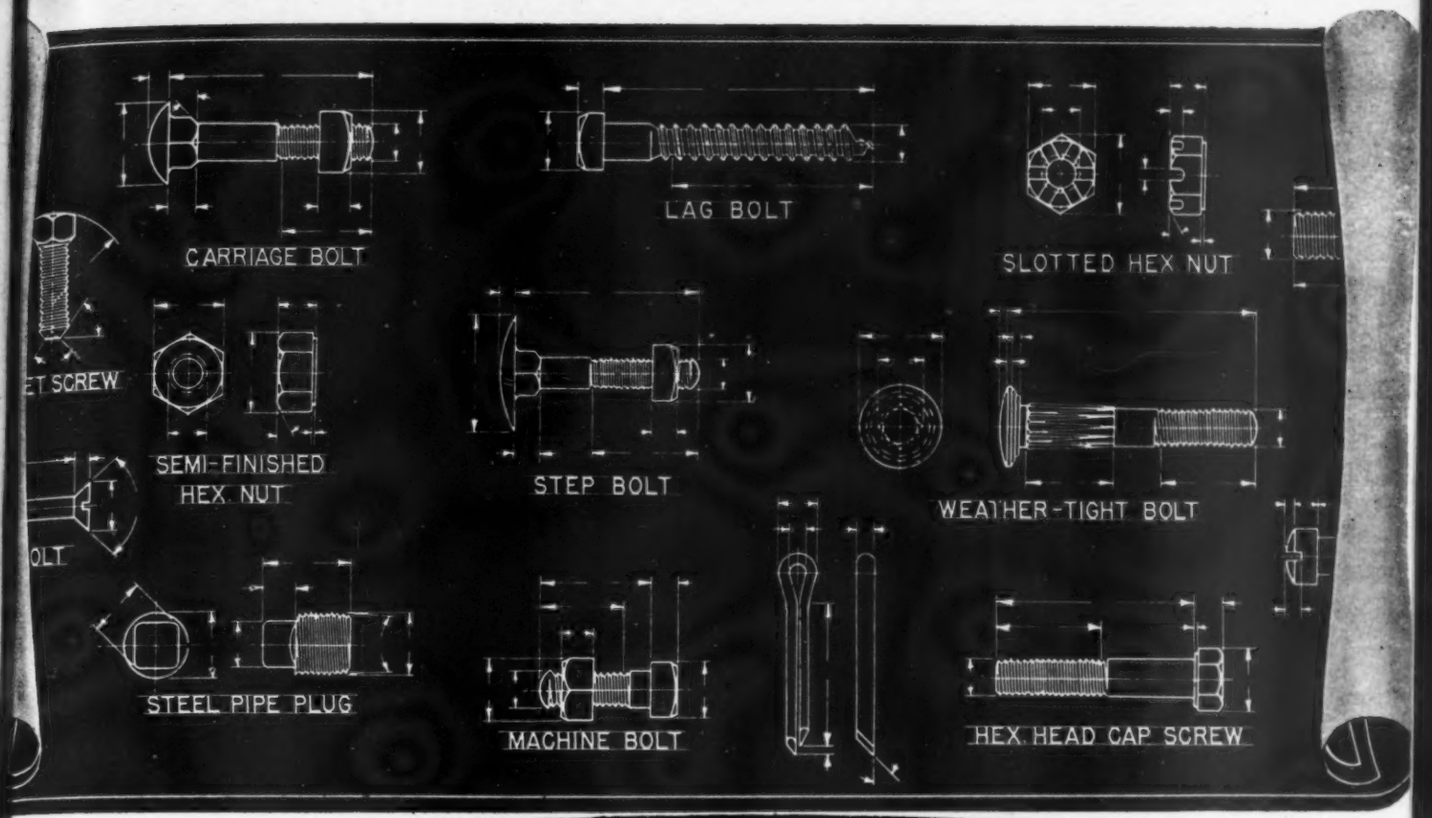
Where the veteran, in all probability, would have received a promotion if he had been on the job and did receive the promotion on reemployment, a federal district court awarded him seniority rights to the higher job as of the date he would "probably" have been promoted and not of the time of the actual promotion. The veteran was originally hired as car cleaner, a position from which the employees were customarily promoted to job of carman helper on the basis of seniority. While the veteran was in service, a job of carman helper was opened and, in all probability, the veteran would have received the higher job if he had been working at the time. Although no contract existed governing promotions, the company's practice of promoting the man with highest seniority in the next lower classification was deemed by the court sufficient reason for its decision. Another point considered by the court was the fact that other car cleaners became carman helpers within a year while it took the veteran involved four years to get the job. (Hewitt v. Chicago South Shore R. R., USDC No. 1 Ind.)

RIGHT TO DISPLACE JUNIOR EMPLOYEES

The Celotex Corporation has recently written into its contract with CIO's Gas, Coke & Chemical Workers a special clause giving veterans the right to displace junior employees who have been promoted to jobs which the veterans would have held had they stayed on the job instead of spending time in the armed forces. The contract also gives the veterans the right to seniority from the date they would have normally succeeded to the job if they had not been away.

The contract clause in question reads as follows:

"Employees who have served in the armed forces during the emergency and who are reemployed by the employer shall have the right to exercise their departmental seniority in the making of application for such jobs where a va-



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MORE than 400,000 *standard* headed and threaded fastenings are made by bolt manufacturers. Thousands of these standard products are always in stock, and those not in stock can be produced quickly.

We also make "specials" to your order, *when you really need* a "special".

But we frequently receive blueprints of special bolts or headed and threaded products which so closely resemble *standard* products we make, that we feel compelled to call this to our customers' attention. All "specials" require both special tools and dies, and special operations—as well as special routing, handling, inspection and even packing—all along the line. This results invariably in higher production costs and slower shipments.

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Do not hesitate to ask for the services of Lamson engineers. *They are trained* to help you determine which *standard* bolt and nut products will fit into the design of *your product* most efficiently and economically. *They are experienced* in having done this for our customers many times before with tangible advantages that our customers appreciate. Ask a Lamson engineer to call to talk it over.

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for 50-page bulletin 504 which gives complete information on Reelites, both portable and constant duty, including special types for air and fluid; or see Sweet's File, Page 2a/19.

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cancy has been filled during their period of absence in the Armed Services and provided that they are reemployed during the period immediately following and not longer than ninety (90) days subsequent to their date of discharge from the armed services. It is understood and agreed that the above referred to employees shall be permitted to make only one application for such jobs and where an upgrading program is in effect they can apply for only the job or position immediately above the job or position held at the time they volunteered or were drafted into the service.

"If the employee has the seniority and is qualified for the job as outlined above then he shall be given the job for which he applied and his seniority standing in that job will be dated from the time the junior employee was given said job.

"Any veteran reemployed prior to the signing of this Agreement shall have fifteen (15) days in which to make application for such job and any employees who return subsequent to the signing of this Agreement must file application within fifteen (15) days following the date of reemployment."

PROFERRED JOB NOT ONE OF "LIKE PAY"

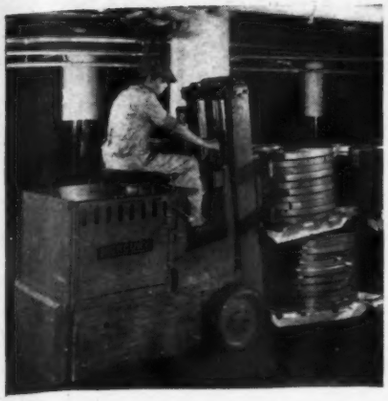
Offer of reinstatement as manager in a branch office different from the one in which the veteran was originally employed was deemed by a federal district court not to constitute fulfillment with the requirements of the Selective Service and Training Act. The veteran originally held a position of manager in one of the company's branch offices, in which job he received $35 a week plus 20 percent of the branch office's net profits. The veteran's position was, at the time of his application for reinstatement, occupied by a man holding a 5-year contract with the company.

Although the company offered the veteran the same terms of employment under which he originally worked, the court held that the proferred territory did not constitute a job of "like pay," since the profits of the new territory would not equal those of his original job. Moreover, the veteran, at the time, was in the process of buying a home in his original territory and transference to another territory would impose the financial burden of moving his home and effects. However, although the court decided in favor of the veteran, it specifically stated that its decision does not require all employers to reemploy former employee-veterans under the Act at the same place of employment as the one they had before entrance into the armed service. The statute makes no such requirement; this rule is not general but special, as the facts of this case merit such a requirement. (Salter v. Becker Roofing Company, USDC M. Ala.)

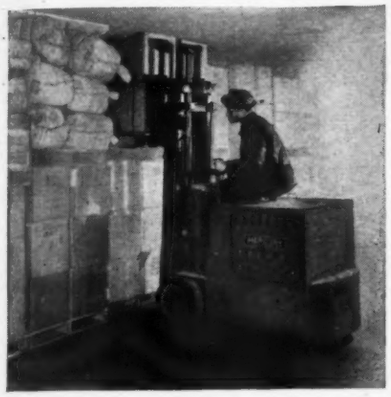
Wage-Hour Regulations

BACK PAY DUE FROM ACCRUAL DATE

Building service and maintenance employees who sought to recover back



Powerful "Jeep" handles heavy load of coiled strip with ease.



"Jeep" tiers loads up to 2000 lbs. with quick precision.

"Jeep" loads live skid, a part of the Mercury "Trackless Train."

Displaying maneuverability that makes the "Jeep" a favorite with industry.

THE MERCURY
"JEEP"
2000 Pounds Capacity

COMPACT, POWERFUL — EASILY MANEUVERED

Rugged—yet so compact that it travels narrow aisles, maneuvers in and out of box cars and through doors with magic ease — that's the Mercury "Jeep" fork truck! Stacks to ceiling height—hydraulically activated hoist and tilt spot loads up to 2000 lbs. with quick accuracy. Lightweight permits use where floor capacity is limited.

Additional features of the "Jeep" include: Mechanical Contactor Travel Control—All Welded Frame—Single Unit Drive. For details, request Bulletin 201-6. Or, ask a Mercury Sales Engineer to call.

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4110 S. Halsted St.,
Chicago 9, Illinois

MERCURY

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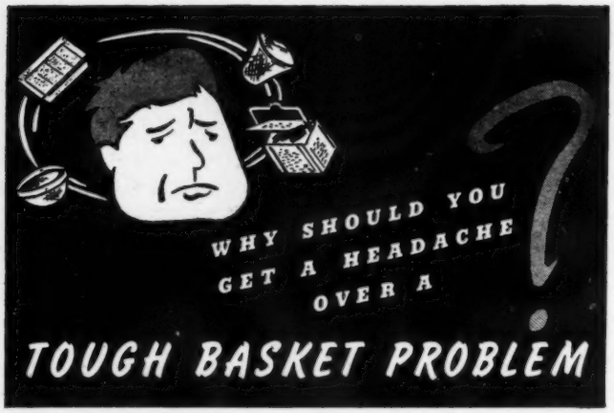

Wrap up your sketches. Accompany them with as complete information as you can scrape together on size, capacity, type of service, conditions to be encountered, etc. Send them on to "Buffalo Wire."

Thousands of other basket "headaches" have been licked in just this way. Let "Buffalo Wire" tackle your metal basket problem, too. Profit by 76 years of turning out tailor-made designs for limitless uses. Capitalize on the modern, versatile facilities for producing any size, shape and weight.

Get a line on the scope of work produced in wire, wire cloth or expanded metal by writing for FOLDER 595. Twenty-two types of baskets are illustrated.

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DIVISION OF AMERICAN MACHINE AND METALS, INC.

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overtime pay due them under the Wage-Hour Law were awarded the amounts due them dating from the time the pay accrued, rather than the subsequent date of the Kirschbaum case under which such employees were held to be covered by the Act, or the date when the employees learned that the latter decision defined their rights. The court stated that the Act itself, and not the decision of that case, gave the right to sue. The pay accrued before the 6-year period set by the state's statute of limitations may not be recovered. (De Luca v. West 26th Street Corporation, NYC Ct., Trial Term, NY County)

SUBSISTENCE ALLOWANCE NOT PART OF REGULAR RATE

In keeping with its view that subsistence allowances paid veteran trainees are not wages, the Wage-Hour Division ruled that such allowance need not be included in computing employee's regular rate of pay for overtime purposes. Thus if the veteran trainees involved were receiving a total of $1 an hour, 70 cents of which was paid by the employer and 30 cents of which came from the government, the overtime rate should be time and one-half of only the 70 cents an hour.

HELD TIME WORKED

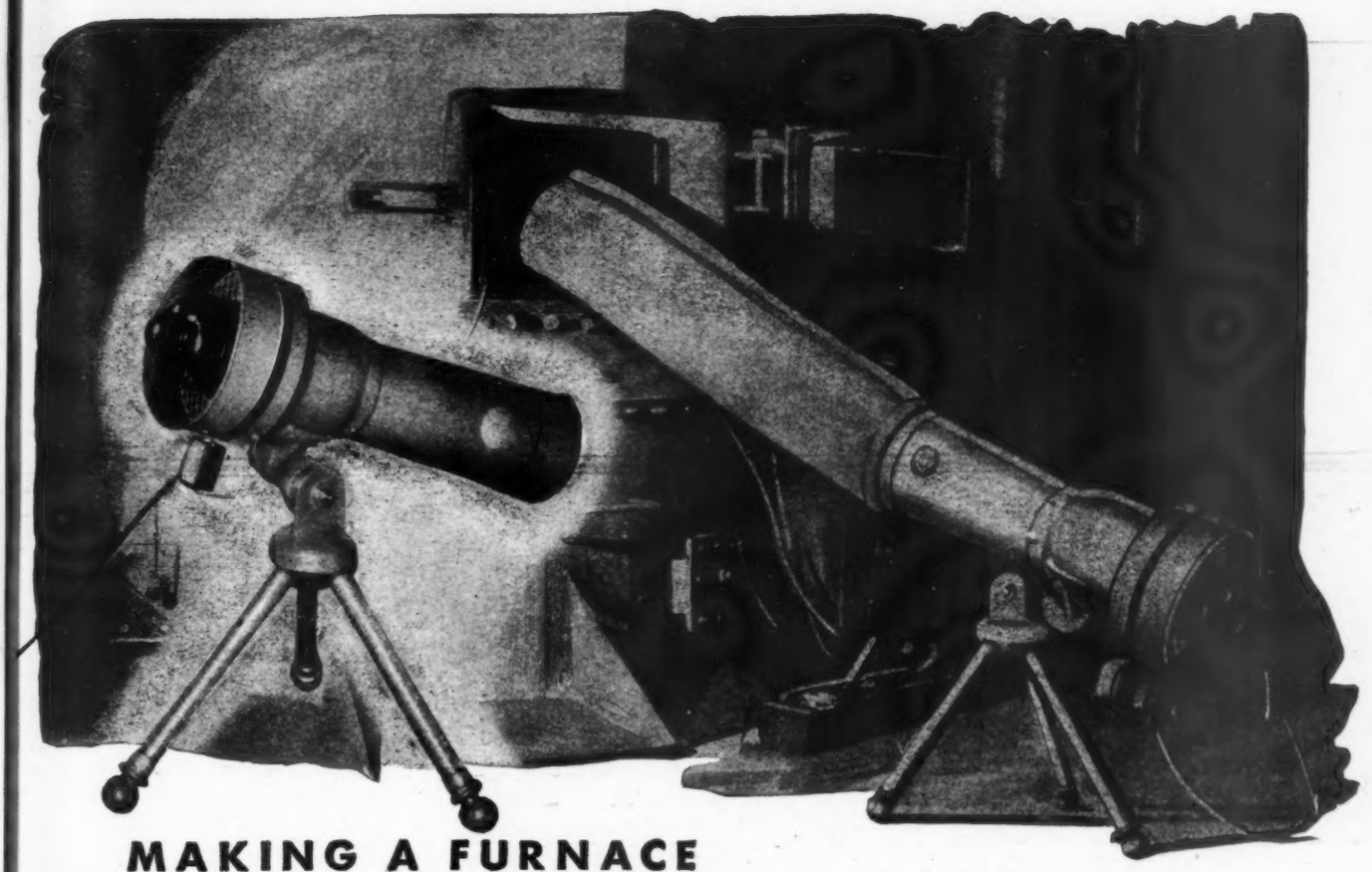
Another federal district court was recently presented with the problem of whether an 8-hour "sleeping" shift spent by firemen in a munitions plant during a 24-hour duty period is compensable. In this case, the court deemed such time non-compensable under the Wage-Hour Law. However, where the firemen were called out on fire alarms during this 8-hour shift, the court awarded them the right to compensation for the full 8 hours. Those firemen who were roused from their sleep but who did not leave the station were held entitled to a minimum of ½-hour overtime compensation. (Eustice v. Federal Cartridge Corporation, USDC Minn.)

WAIVER OF BACK PAY REJECTED

Refusing to accept financial difficulties of the employer as a basis for a valid waiver of part of a wage claim, a circuit court of appeals follows the pattern laid down by the U. S. Supreme Court in two former cases by invalidating a waiver of a wage claim signed by the employees because of the employer's financial situation. The waiver had been executed by a group of employees for the full amounts of their wage claims. The employees accepted less than the full amounts due them on the theory that the employer could pay no more. The court refused to take cognizance of the employer's financial hardship as ground for validating the waiver. (Torres v. American Railroad Company, CCA-1)

RECORDS IN CASE OF MULTIPLE EMPLOYERS

Where two or more firms are considered to be the employer of an employee, that



MAKING A FURNACE A BETTER PLACE TO LIVE IN

When a furnace or anything in a confined space needs attention, a Coppus Blower will make the interior livable in a short while, reducing down time.

From the Coppus "Blue Ribbon" line of blowers and exhausters, you can find exactly the right ones to help you save time and improve working efficiency on jobs where confined spaces must be cleared of fumes or foul air . . . where heat exhaustion threatens . . . where equipment or material in process needs to be dried. There are Boiler Manhole Blowers and Exhausters, Cable Manhole and Tank Ventilators, Shiphold Ventilators, Heat Killers and other types—all designed to put the right amount of air where you want it, at lowest cost.

The blue band painted around each Coppus product signifies "Blue Ribbon" materials and workmanship, promising you long trouble-free service despite the severe usage such portable equipment gets.

For specific information check and mail the coupon.

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Address Coppus Engineering Corporation, 627 Park Avenue, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other "Blue Ribbon" Products in SWEET'S CATALOG, CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG.

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Please send information on how to plug Man-Hour Losses with air.

- ☐ in tanks, tank cars, drums, etc.
- ☐ in underground cable manholes.
- ☐ in aeroplane fusilages, wings, etc.
- ☐ on coke ovens.
- ☐ on steam-heated rubber processes.
- ☐ on boiler repair jobs.

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- ☐ stirring up stagnant air wherever men are working or material is drying.

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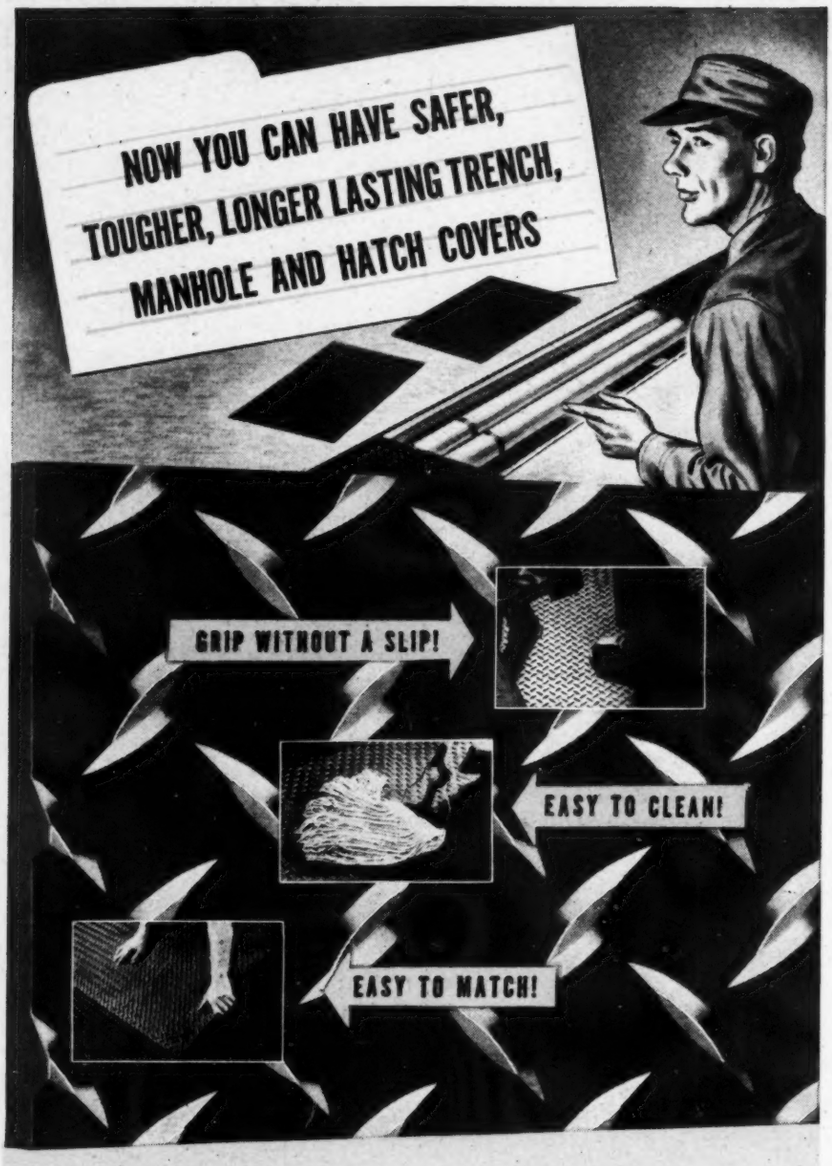
(Write here any special ventilating problem you may have).



Overnight you can convert worn and broken trench covers, loading platforms, stairways and similar surfaces into non-skid working areas. How? By using AW Super-Diamond Floor Plate, just as thousands of large and small plants throughout the country are doing. The Engineered AW Super-Diamond pattern grips without a slip and prevents costly accidents. Then too because the design has no square corners it is easy to clean, and it drains and dries rapidly. Here is the most economical floor plate ever developed. Oil, fire and heat resistant. Even the heaviest traffic does not damage it and it can be quickly cut and installed in your plant because the continuous pattern is easy to match.

End your floor maintenance headaches now! Get complete information by writing for your free copy of the helpful 16 page booklet L-25. Alan Wood Steel Co., Conshohocken, Pa.

AW SUPER-DIAMOND

FLOOR PLATES THAT GRIP

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LABOR DEVELOPMENTS *(continued)*

employer who actually pays the employee his compensation is responsible for maintaining Wage-Hour records as required by the statute. It is that employer who also has the primary duty of compliance with the Act as to the hours of employment. Employers are required to keep a definite form of records for four years either at the place of employment or at an established central record-keeping office.

HELD UNDER THE ACT

On the ground that an employment relationship and an independent contract relationship may not exist concurrently, the Wage-Hour Division states that employees who perform at a flat rate work at home of the same type that they do at their employer's place of business are entitled to the benefits of the Wage-Hour Law. Inquiry concerning this issue was made to the Wage-Hour Division by a publishing company which wished to contract with its employees as independent contractors to proofread at home at the flat rate of $0.50 without provision for overtime. The Division averred that a company that suffers or permits an employee to work cannot deprive him of the benefits of the Act.

HELD EXEMPT

Buyers in an ordnance plant who, although not determining the type of goods to be bought nor the terms of the purchase, did determine the selection and rotation of available bidders, a task that required the exercise of discretion and independent judgment. (Austin v. Federal Cartridge Corporation, USDC Minn.)

Fireman engaged in maintaining the proper heat in a greenhouse, since he is an agriculture worker in that he is necessary to the growing of the flowers therein. (Damutz v. Wm. Pichbeck, Inc., USDC Conn.)

HELD NOT EXEMPT

Section foreman in a cigar factory, since he had no discretion in matters of any consequence, he did not make final decisions or exercise independent judgment, his functions were largely directed by the head foreman and the superintendent, and since more than 20 percent of his work was purely manual labor and not the work of an executive. (Houtenbrink v. General Cigar Company, USDC S. N.Y.)

RECONVERSION CONTROLS

***INCREASES DEEMED PRE-APPROVED**

In the building and construction industry, employers must obtain board approval for any wage increase or decrease.

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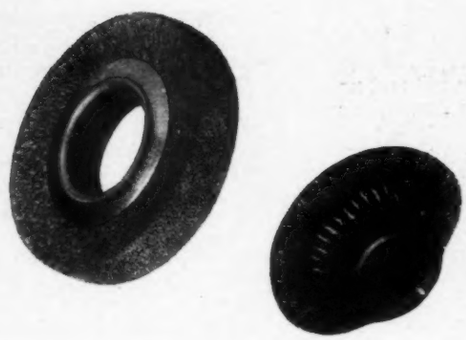
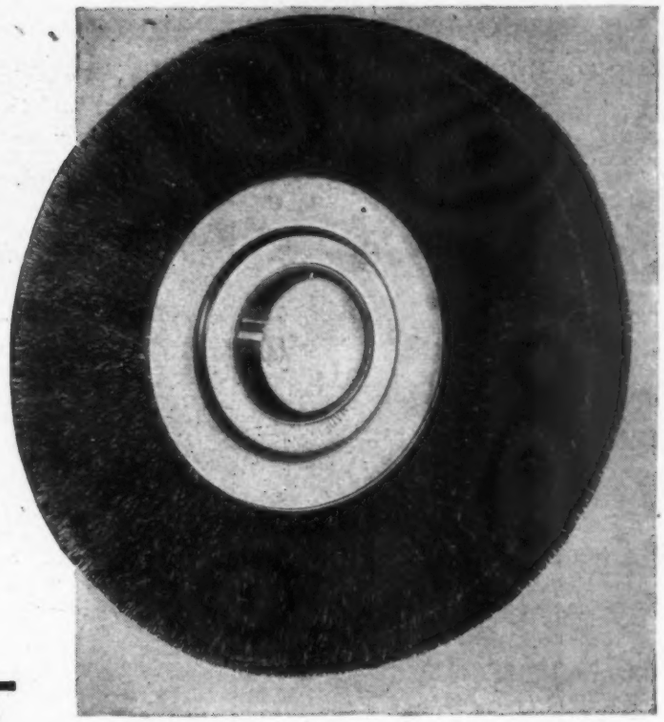
* In this and the following classification items marked with an asterisk also are considered to be trend indicators.





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Firmly anchored to the core by a patented, strength-adding process, the Double-Durable special crimp wire which fills Thor Wire Wheel Brushes has above-average resistance to crystallization and breakage. It holds its strength longer for continued efficiency in cleaning, de-burring, roughing and burnishing. Used on portable or stationary equipment with spindle speeds up to 6000 r.p.m., these Thor brushes do better work with maximum economy.

Made in sizes from 4" to 12" diameter, with wire from 30 to 36 gauge, Thor brushes are available in single-unit, arbor-hole adaptor or metal-center sectional types. A new Thor folder, No. 538, makes selection of the proper brushes for your jobs simple. Write for your FREE copy . . . today.

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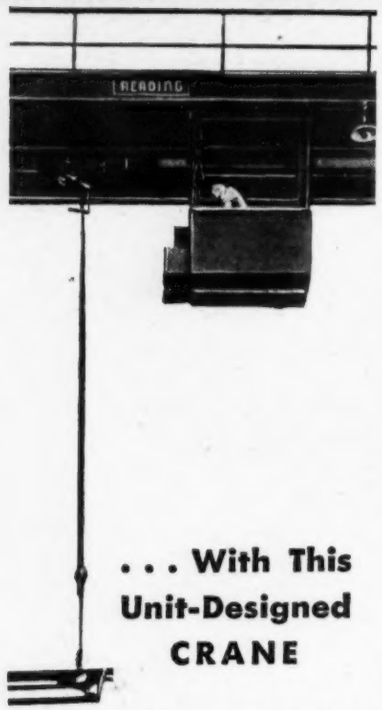

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LABOR DEVELOPMENTS *(continued)*

The following rates, however, are considered to be "pre-approved" and need not be submitted to the Board before their institution:

1. Wage or salary rates determined by the Secretary of Labor under the Davis-Bacon Act.

2. Area rates adopted by the adjustment board for mechanics or laborers working on non-federal projects.

3. Established rates for mechanics or laborers working on non-federal projects (these rates have been specifically approved by the board or were actually paid by the employer on October 2, 1942).

4. Substandard increases up to 65 cents an hour.

5. Payments for actual travel time at the approved rate and for actual traveling expenses, when an employee is required to travel to a different working site during the work day.

6. Increased rates for foremen, provided the rate maintains the differential established in the particular area prior to October 2, 1942, or approved thereafter by the board, between the foremen's rate and the related approved job classification rate.

7. Actual travel expense, subsistence or premium compensation for work outside the regular work day or work week if (1) established area practice before October 2, 1942, or (2) specifically approved by the board as an area practice, or (3) established by the employer as a company practice in the same area before October 2, 1942.

***PENALTY FOR UNAUTHORIZED DECREASE**

An employer's failure to pay a year-end bonus, elimination of two 10-min. smoking periods, and reduction in an employee's wages brought about the imposition of a $6000 tax penalty by the WSB. Because of extenuating circumstances, namely that the company agreed to pay the bonus retroactively, the employees were now permitted to smoke on the job, and the wage decrease was commensurate with a drop in the employee's duties, the board reduced the potential penalties from $25,000 to $6000. (Horst Manufacturing Company, WSB)

***APPROVAL DENIED FOR DECREASES**

In the following instances the WSB disapproved the contemplated pay-adjustments:

1. Company's request to reduce salesmen's commission rate on new accounts so that their efforts would be concentrated on old accounts. Although the company maintained that a decrease in earnings would not necessarily result, the board unanimously denied the proposed reduction as an unallowable wage decrease. (Acme Visible Records, Inc., WSB)

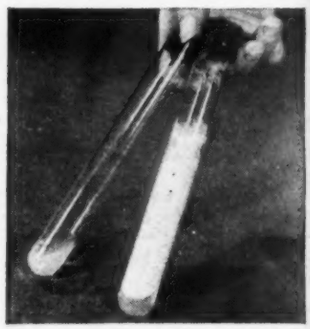
2. Elimination of the company's practice of counting as time worked reasonable absences of employees who have worked for the company 6 months or more. The company contended that

Silicone News

DC SILICONES

DC Antifoam A—*recently developed silicone foam killer useful in many industries.*

". . . the most generally useful and effective foam killer we have ever tested"



DC Antifoam A in concentrations of 70 parts per million prevents foaming of rosin soap solutions.

When DC Antifoam A was first introduced, laboratory tests had indicated its ability to kill foam in a variety of aqueous solutions and emulsions even during steam distillation and vacuum evaporation. Since then it has been found effective in many laboratory procedures and in many plant operations.

DC Antifoam A in very low concentrations is now used to prevent foaming:

In Adhesives
In the Varnish and Lacquer Industries
In the processing of pharmaceuticals
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In the Rubber Industry. Specifically in the concentration of GRS., Neoprene and butadiene—styrene copolymers.

TYPICAL OF MANY REPORTS RECEIVED— "We are using DC Antifoam A in a vacuum concentration of an alkaline aqueous protein solution. One ounce of DC Antifoam A replaces about 2 gallons of the foam inhibitor previously used and eliminates about ten man-hours of labor previously required to control the process."

Additional Data about DC Antifoam A is contained in leaflet No. E 6-1.

Also of interest to plant operating officials are the Dow Corning Silicone Greases for the lubrication of bearings operating at abnormally high or low temperatures. Ask for data sheet No. E 7-1.

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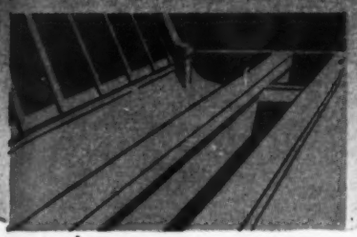

STEEL AND CONCRETE need protection from corrosive smoke and fumes. Brush or spray on a protective coating of Hydralt, as in this railroad station smoke slot.

INSULATION MATERIALS, exposed to weather, are protected by fibrated types of Hydralt coatings.

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More of them than you expected, aren't there?

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You can apply Hydralt *cold*, with brush or spray. Or even trowel it on. It's odorless and non-toxic. Easy, economical to use.

And *Hydralt* is *durable*. Extensive tests show that it will far outlast any other form of bituminous coating exposed to weather.

A new folder gives full details about Flintkote's *Hydralt* Protective Coatings. Mail the coupon today for your free copy.

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Shipments go everywhere at the speed of flight between principal U. S. towns and cities, with cost including special pick-up and delivery. Same-day delivery between many airport towns and cities. Fastest air-rail service to and from 23,000 off-airline communities in the United States. Service direct by air to and from scores of foreign countries in the world's best planes, giving the world's best service.

RATES CUT 22% SINCE 1943 (U. S. A.)

AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs.	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07c
349	1.02	1.18	2.30	3.68	9.21c
549	1.07	1.42	3.84	6.14	15.35c
1049	1.17	1.98	7.68	12.28	30.70c
2349	1.45	3.53	17.65	28.24	70.61c
Over 2350	1.47	3.68	18.42	29.47	73.68c

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elimination of such practice was prop since employees had abused the use it. (Advance Aluminum Casting Co poration, WSB)

3. Reduction of the rates of eleven em ployees who were receiving wages i excess of the rate range maximums aft the institution of a new wage schedu (Edo Aircraft Corporation, WSB)

4. Proposed reduction in vacation po although the board declared that th denial would not prejudice the com pany's right to submit a revised plan i which the reduction in vacation allow ances would not exceed the actual re ductions in the scheduled work wee (Everett Pacific Shipbuilding & Dr Dock Company, WSB)

5. Reduction in salesmen's commissio rates because of an increase in the pric of the product sold. The board foun that despite the increased price, th salesmen's commission would fall off be cause of the proposed reduction. (In ternational Heater Company, WSB)

*NO NOTICE FOR APPROVAL OF INCREAS

Employers need no longer file forma notices within 30 days after increasin salaries as a preliminary to seekin higher OPA price ceilings. Althoug these salary increases must receive for mal approval before they can be used as a basis for price relief, this new ruling enables the employer to apply for ap proval of the salaries at his own con venience and without prior notice However, prior approval must be ob tained to (1) reduce salaries below $5000, or (2) establish in a new plant (or in a new department of an existing plant) salary rates in excess of the minimum of those prevailing in the in dustry or locality.

*WAGE INCREASE DENIED

A 3½-cent wage increase negotiated by West Coast lumber operators and a number of unions, and approved by the labor-employer majority of the WSB, was disapproved by John R. Steelman, Director of Economic Stabilization for pricing purposes. Steelman pointed out that this increase would have exceeded the reconversion wage pattern of 15 cents established for the industry. Steelman disagreed with the board that "special circumstances" existed to warrant the additional 3½-cent increase.

*DISCONTINUANCE OF DOUBLE TIME DENIED

The WSB recently denied an employer's request to discontinue the payment of double time for work on the seventh consecutive day of the work week. Such payment was made mandatory by Executive Order 9240. On April 15, 1946, the board announced that companies could revert within a reasonable period of time from premium pay practices instituted by the Order to those in effect in the plant on September 9, 1942. Although the board never defined what it meant by a "reasonable" period, one of its regional boards declared that such

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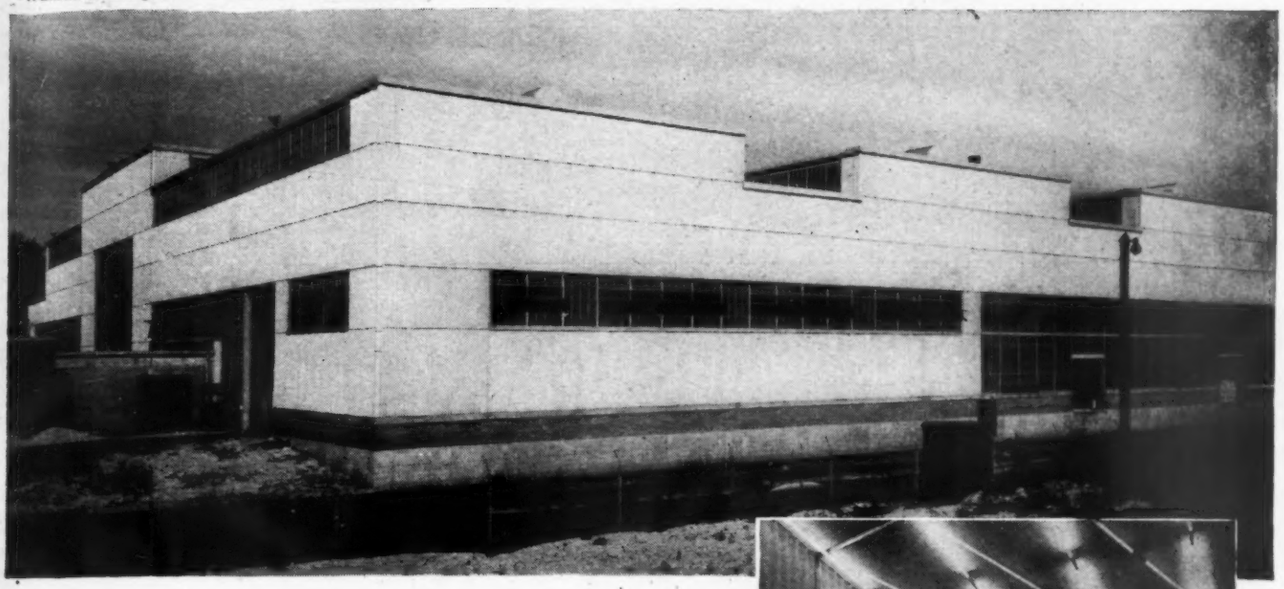

Simplify your construction, make it modern in design, with J-M Corrugated Asbestos Transite. It can't rot, can't rust, can't burn. And it's low in cost, too.

NOTE THE STREAMLINED simplicity of the factory shown above . . . and the unusual decorative effect achieved in the interior of the camera shop.

Here are typical examples showing how Johns-Manville Corrugated Transite is attractively functional, used inside or out.

With its pleasing symmetrical lines and natural stone-gray color, you can use these durable sheets for walls and roofs . . . or as an interior finish . . . on practically every type of building.

You save both on construction and maintenance, because Corrugated Transite requires no upkeep . . . is quickly and inexpensively installed . . . and is 100% salvageable if alterations are required.

The large fireproof sheets are made of asbestos and cement, practically indestructible materials. Their unusual strength is further increased by corrugations—permitting a minimum of framing.

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EASY TO BOLT TO STEEL

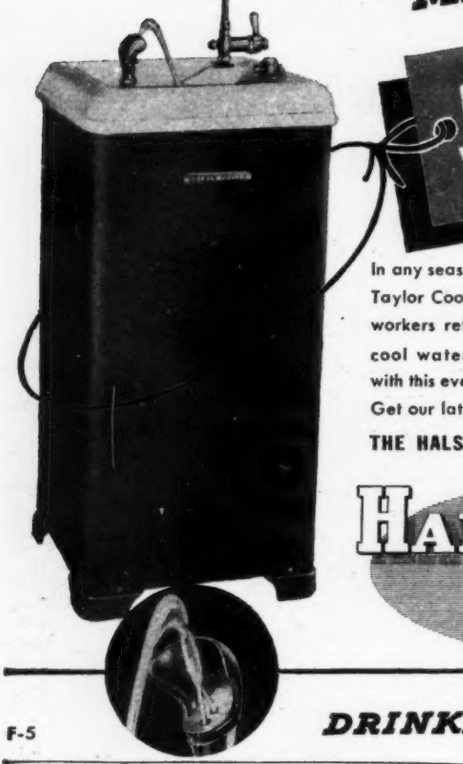
EASY TO SAW

EASY TO DRILL

EASY TO NAIL TO WOOD

Johns-Manville *Asbestos* **CORRUGATED TRANSITE**

In THE NATION'S MAJOR PLANTS



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. . with the TOTE-ALL!

Packaged material or bulk products—it's all the same to the versatile Tote-All combination conveyor. You buy the Tote-All packed material conveyor—handle all your conveying of boxes, cartons, bags, crates, etc.—then *in a matter of minutes* you can attach sideboards and hopper and have a husky conveyor ready to handle sand, coal, gravel, fertilizer or any bulk material up to 14" top size.

The Tote-All Combination Conveyor may be had without Trail-Hoist frame for easy moving from job to job and quick adjustment of conveying angle. Two lengths, 14 ft. and 20 ft., 10 in belt. Gasoline or electric power unit optional. You can save time and equipment and reduce your material handling costs to a minimum with this Tote-All. Get full details today—write for Bulletin F. M.

THE ONLY DOUBLE-DUTY PORTABLE POWER CONVEYOR ON THE MARKET!

. . . from a packaged material conveyor to a bulk material conveyor *in a matter of minutes.* Photo above shows the Tote-All being used as a package conveyor. View at right shows the same conveyor., with sideboards and hopper attached, being used as a bulk conveyor.

Tote-All

MATERIAL MOVEMENT INDUSTRIES
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310 S. Michigan Ave., Chicago 4, Illinois

PORTABLE POWER CONVEYOR

period was either (1) the first pay period after publication in the Federal Register of the Order rescinding 9240 or (2) on or before October 1, 1945, in cases where the discontinuance of double-time payments coincided with an increase in straight-time rates. The national board upheld the regional board's conclusion that the company had not acted to discontinue such payments within a "reasonable" time. (J. I. Roberts Drilling Company, WSB)

***DEMOTION HELD UNALLOWABLE DECREASE**

The WSB recently held unapprovable a provision for demotion included in an employer's merit-rating plan because such plan would have effected unallowable decreases. Under the plan, an employee could be demoted if he failed to improve his performance so as to be eligible for further merit increases. The board held that demotion for such reason did not fall within the rules for allowable decreases under wage stabilization rules. (F. C. Huyck & Sons, WSB)

NATIONAL LABOR RELATIONS BOARD

***FOREMEN PERMITTED TO BARGAIN COLLECTIVELY**

Although recognizing the fact that foremen are the front line of management, a circuit court of appeals upheld the NLRB's finding that foremen, in the role of employees, are entitled to bargain collectively with respect to their own wages and conditions of work. The court pointed out, however, that its ruling is applicable in only those instances where the foremen's bargaining unit is separate and independent from the one representing the production employees. (NLRB v. Packard Motor Car Company, CCA—6)

***FOREMEN UNIT HELD APPROPRIATE**

The NLRB recently declared a unit of foremen of a large steel plant appropriate for bargaining purposes. The foremen participated in the formulation of company policy to a minor degree, in that they only made occasional suggestions but did not play a part in the formulation of plant-wide management policy. (International Harvester Company, NLRB)

***DUTY TO BARGAIN**

A union's 9-year-old renunciation of its right exclusively to represent employees does not relieve the employer of his duty to bargain collectively when called upon to do so. This issue was raised when the union insisted upon a contract in which provision was made for a closed shop. Nine years previously the union had agreed to recognize the right of any employee who was not a member of the union to deal individually with the employer.

On the basis of this renunciation the employer refused to discuss any of the

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...in your hands

American Phillips Screws begin your savings with *speed of handling* . . . which means firm fit of the 4-winged Phillips Driver into the engineered, tapered recess. And American Phillips Screws build up your savings with *automatic straight-driving accuracy,* assured by the fact that screw and driver form one single, straight-line unit. *Assembly costs drop 50%.*

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If *you* use American Phillips Screws in *your* product, merchandise them for all they're worth—*and they're worth plenty!*

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ALL TYPES
ALL METALS: Steel, Brass, Commercial Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

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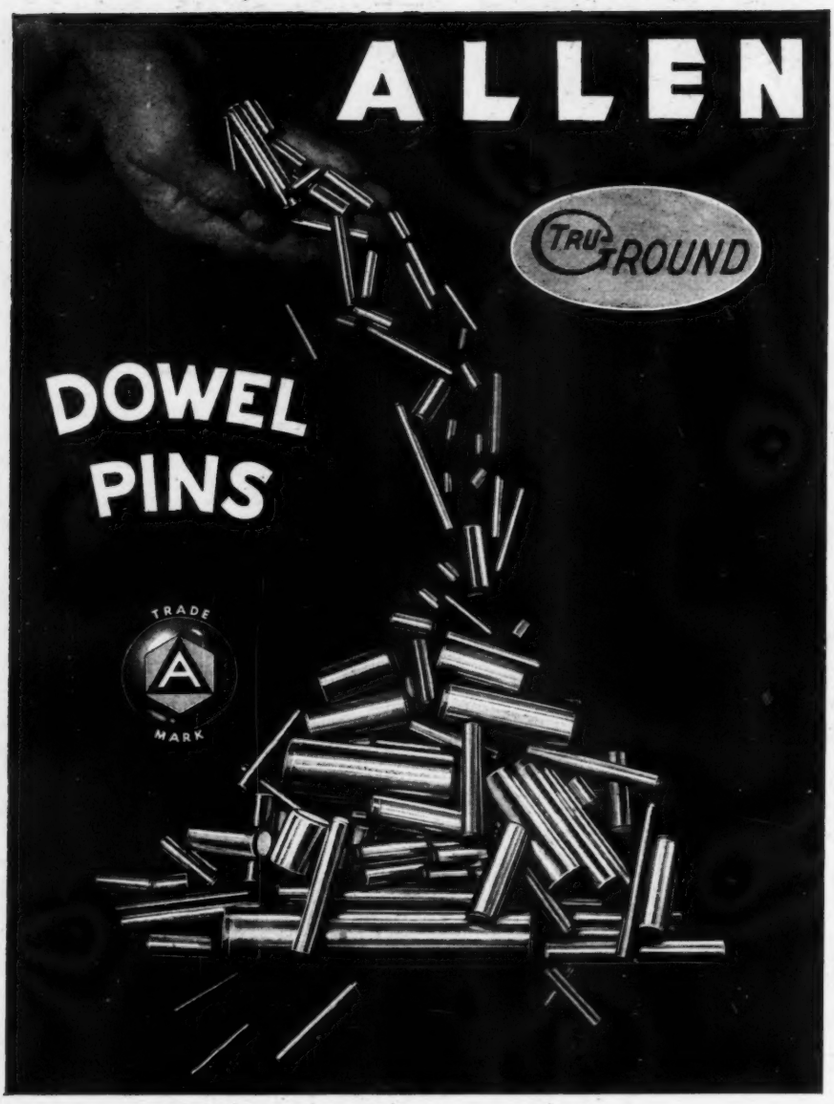

They serve as locating pins for the diemaker's work — and function further as perfect shafts for pins and pivots in various machine assemblies.

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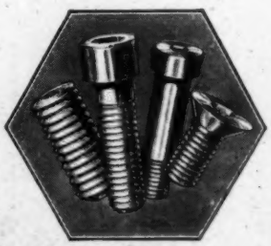

ALLEN Hollow Set Screws, Socket Head Cap Screws and Flat Head Cap Screws, "Tru-Ground" Shoulder Screws, Square Head Set Screws, Pipe Plugs, Key Kits, "Tru-Ground" Dowel Pins, Tap Extensions.

THE ALLEN MANUFACTURING COMPANY
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union's demands but it never challenged the union's majority status.

The trial examiner, hearing the case, recommended setting aside the agreement since, in his opinion, the union was entitled under the Wagner Act to exclusive representation of all the employees despite its renunciation.

On the finding that the employer entered into every conference with the predetermination of forcing the union to acquiesce in the acceptance of its previous renunciation, and then to reject every demand at variance with it, the trial examiner recommended a finding of refusal to bargain. This attitude on the part of the employer does not constitute good faith in bargaining but is rather a "one-way insistence by the respondent (employer) of acceptance of a predetermined position in lieu of which negotiations would suspend." (J. I. Case Company)

***DETERMINING BARGAINING UNIT NOT BARRED**

Certification of a union which has only run for 3 months does not bar a present determination of bargaining agent where the majority of employees vote to join a rival union. The NLRB stressed the fact that the transference of affiliation was effected by a "collective formalized effort" on the part of the employees and not by "individual action." Where 95 percent of the union's membership votes to change affiliation, the board pointed out, the very character of the bargaining representative is changed, and doubt is raised as to the identity of labor organization the employees wish to represent them. Nor does the fact that unfair labor practice charges are pending bar a redetermination of the bargaining unit, since the loss of membership in the union could not be attributed to the employer's unfair labor practice. (Carson Pirie Scott & Company, NLRB)

***TENURE OF CONTRACT HELD REASONABLE**

On a finding that a majority of the collective bargaining contracts in the industry in the particular locality were for a 3-year term, the NLRB upheld as reasonable a 3-year contract between a union and employer engaged in the baking industry. The board pointed out that because of the structure in one baking industry—i.e., the nature of the business is local because of the perishability of its goods—the contract practice in the particular locality is the governing factor. (Omar, Inc., NLRB)

PAY ORDERED FOR INCENTIVE WORKERS

Incentive workers were awarded the right to average hourly earnings rather than their base rates during periods when there are machine breakdowns.

Both the union and the employer agreed that average earnings would be paid for downtime occasioned by sample work, experimental runs, work requiring special handling, steward's time, rest periods when machines are shut down, downtime which is no fault of the

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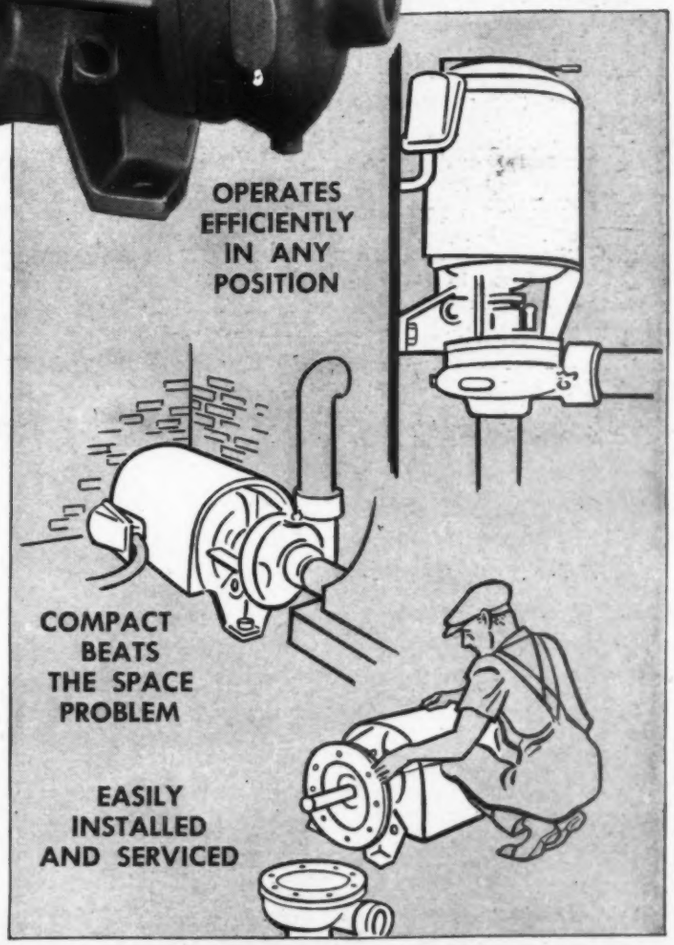

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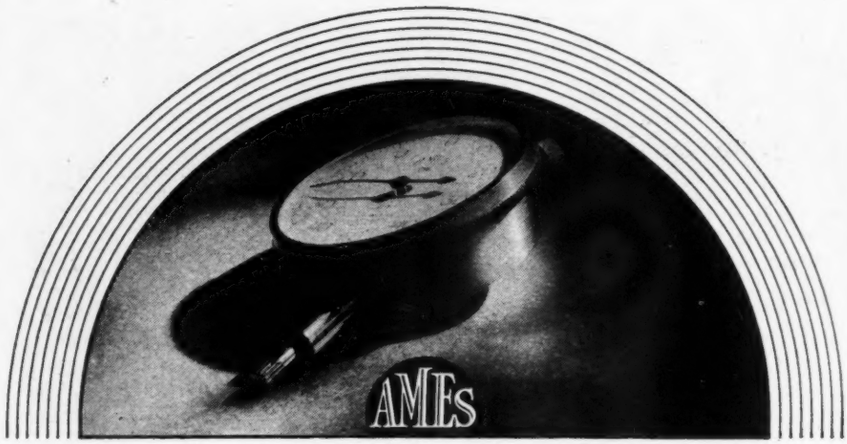

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worker, such as bad material, bad dope, lack of dope or material, and irregular scheduling, and that base rates would be paid for downtime occasioned by special cleaning and painting, extra work not considered productive labor, and work stoppages beyond the company's control, such as power failures, heat failure, fire, water, explosion.

The company contended that if employees were to receive average earnings for the period of machine breakdown, it would encourage carelessness on the employees' part. The union, however, pointed out that the company involved is located in an area in which such downtime is paid for at average earning rates and that during stabilization a regional war labor board ordered average earnings during such breakdowns. Moreover the practice generally in American industry is to pay average earnings during such periods of breakdown.

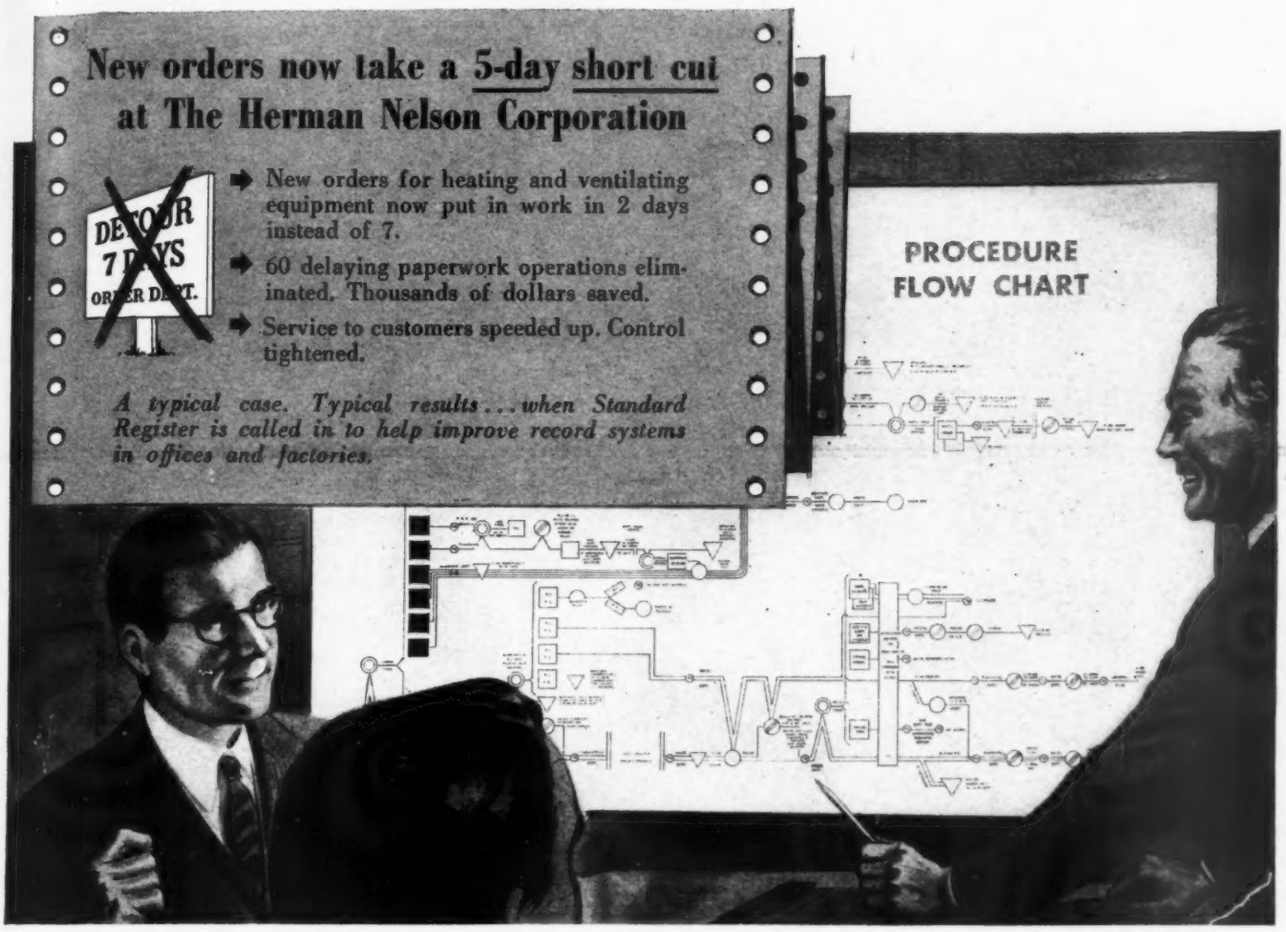
While the arbitrator concedes that it is possible that some employees may deliberately conceal the fact that a breakdown is about to occur because they will suffer no financial loss thereby, he points out that nothing in the relationship between the company and its employees reflects such bad will as to indicate the likelihood of such occurrence. Accordingly, the arbitrator awarded average earnings for downtime caused by machine breakdown. (In re arbitration between Pantasote Company and Textile Workers Union of America, Local 343)

***DISCHARGE OF RESIGNING EMPLOYEES HELD DISCRIMINATORY**

The discharge of two employees who resigned their membership in the contracting union during the interim between the expiration and renewal of the latter's contract, was deemed discriminatory by the NLRB. The union had demanded their discharge on the basis of its maintenance-of-membership clause included in the renewed contract. The board pointed out, however, that the maintenance-of-membership clause was inoperative during the lapse of contractual relationship and that it could not be made retroactive for that period. As stated by the board:

"If the retroactive effect of such provisions for the period between the termination of the old and the execution of new contracts should be condoned, a union would be enabled to establish a closed shop for an unreasonable period, indeed for an indefinitely long time or perhaps even in perpetuity, since the union could thus require membership in its organization not only for the duration of its contracts with an employer but also for the interim period between the lapse of the old and execution of the new contracts." (Colonie Fibre Company, Inc., NLRB)

The discharge of employees who went out on strike to compel the employer to recognize their union instead of the union certified as the lawful bargaining agent was deemed discriminatory in view of the fact that the employer con-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60 delaying paperwork operations eliminated. Thousands of dollars saved.
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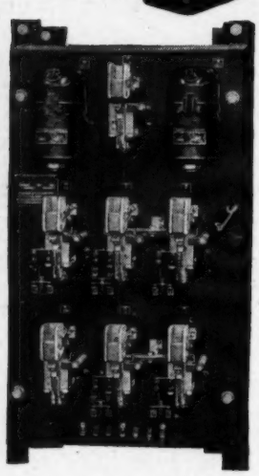
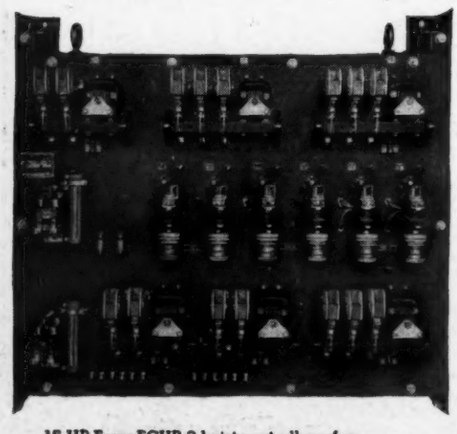


Form FCR Controller for trolley or bridge motion—for direct current floor-operated cranes.

This EC&M standardized line of controllers is designed for (1) accurate inching, (2) compact mounting, and (3) minimum collector-bar requirements. They can be conveniently installed along the crane girders or mounted on the trolley, as required.

They have all the advantages of the well-known EC&M Control for *cab-operated* cranes. Contactors are of the heavy-duty, magnetic type. Resistors are carefully proportioned for low-torque hoisting of light loads and for smooth acceleration of bridge or trolley. All motions can be controlled from a single, pendant, master-station with two Push Buttons for each. Individual rope-operated Master Switches are optional.



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LABOR DEVELOPMENTS *(continued)*

doned the strikers' action by offering to reemploy them. When the employees refused to return to work after the offer of reemployment, the employer discharged them, an act the board condemned as discriminatory. Although the employees were awarded reinstatement rights, the board denied them back pay. Although not stated by the board, its opinion implied that if the employer had not condoned the strikers' action by offering to take them back, reinstatement rights would have been denied them. (Thompson Products, Inc., NLRB)

***HELD DOMINATION**

A junior board of a so-called multiple management plan was condemned by the court on the ground that it was a dominated labor organization. The board, composed of members chosen by the employer, made recommendations to the employer concerning pay rates, hours, and other conditions of employment. Furthermore the board's expenses were paid by the employer. In view of these facts, the court upheld the NLRB's findings that the board was a labor organization and that it was company dominated. (NLRB v. Matthews & Company, CCA-3)

***HELD INTERFERENCE**

Despite the fact that no reference was made to the union involved, an employer's speech delivered to an "involuntary audience of employees" was deemed interference where the statements made threatened the employees with loss of employment should their organizational efforts be continued. The NLRB pointed out that the speech was not an argument against the union but contained an intimation of reprisal for the employees' exercise of their statutory rights of organization. (Van Raalte, Inc., NLRB)

***HELD NOT COERCION**

Although the board declared that intimidation or coercion could be accomplished by looks as well as words, it held that an employer's scrutinization of employees' union buttons on the first day they were worn was non-coercive. Such action on the employer's part is permissible, the board stated, provided the employer's attitude in doing so is not intimidatory or coercive. (Novelty Peanut Company, NLRB)

TAXES DUE ON BACK PAY

The Bureau of Internal Revenue ruled that social security taxes are due on back wages paid to discriminatorily discharged employees. However, the Bureau has now revised its ruling so that taxes on back pay need not be paid retroactively if the employer files reports of the amounts paid with the Bureau on prescribed forms. Failure to file such forms renders the employer liable for taxes on the amounts paid as back wages.

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This plan can be tailored to your requirements. It can give varying degrees of protection to various types of workers, as desired. It assures you, and your employees, that they are protected—on the job or off the job, for 24 hours a day—it frees them from worry about medical, surgical, and hospital bills for themselves and for their dependents.

Peace of mind is the greatest single contribution you can make toward the efficiency of your employees. With it, they work better and produce more; the accident rate drops, and with it the cost of your other insurance.

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ON THE JOB... safety engineering cuts down accidents, saves manhours, reduces insurance costs

Workers naturally prefer pay checks to compensation checks. When you carry Employers Mutuals Workmen's Compensation, E-M Safety Engineering helps keep your employees on the job and out of the hospital.

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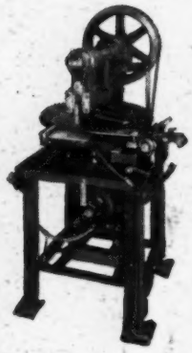

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The Hand Label Embosser (above)

Hand-operated Model BB (left).

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UNION WAGE POLICIES CALLED TEMPORARY

In a critical examination of union wage policies, Professor Sumner H. Slichter of Harvard held that the fight for prestige among unions and union leaders has forced a temporary abandonment of the usual considerations in wage negotiations. Dr. Slichter explained his conclusions in an address before the Academy of Political Science:

The picture of a helpless wage-earner dealing with a large employer . . . is not easily reconciled with the wage and price movements of the last century. Indeed, technological progress has produced a far greater rise in wages than it has a fall in the prices of commodities. . . . Between 1840 and 1940, hourly earnings of non-agricultural workers rose about ninefold. The index of wholesale prices rose about 10 percent. . . . The rapid rise in wages relative to prices happened during a period when trade unions were weak in most industries. One might be tempted to explain the strong bargaining position of labor by the fact that over half of non-agricultural employees are working with firms having less than 100 employees and over one third with firms having less than 50 employees. This explanation, however, encounters the difficulty that large firms usually pay more than small ones. . . . No industry has yet been discovered in which small concerns as a general rule pay higher wages than large ones.

What kind of employers pursue what kind of policies? If one uses the straight-time hourly earnings of common labor as a rough index of the relative wage rates in different industries, one finds that wages tend to be high where the ratio of labor costs are a high proportion of sales income and where the proportion of women employed in the industry is high.

How do unions make wage policies?

The leaders who make union wage policies seek to win the approval of the members, but this does not necessarily mean that the leaders should be described as representing specific ideas held by the rank and file. That would imply that most of the members have given careful consideration to various alternatives and have developed a well-devised scale of preferences. . . . Within a wide range of alternatives [the rank and file] are usually willing to accept the objectives recommended to them by their leaders, particularly if the leaders are strong and colorful, and have won a reputation in times past as valiant fighters for the rank and file. Quite naturally the leader who is eager to advance toward a place of greater power and prominence in the labor movement is likely to select policies with that end in view. These will not necessarily be the policies that will maximize the present value of the future incomes of union members. Rivalries between unions and union leaders may produce competition in toughness between two unions. An ambitious and publicity-loving leader may fight hard to get a larger increase than some other leader, regardless of the long-run consequences to the rank and file. . . . If the leaders undertake to represent any group of union members in selecting wage policies (or other policies), it is not likely to be some sort of "average" members but a small aggressive minority which has quite definite and firmly held preferences.

AGGRESSIVE LEADERS POPULAR

Despite the influence of the ambitions and rivalries of leaders upon union policies, the usual situation does not appear to have been that the leaders have been too aggressive for the rank and file. On the contrary, when leaders have been displaced or when segments of unions have broken away from the parent organization, the revolt has almost invariably been against officers who were too conservative and slow-moving. For example, between 1866 and 1939 there were 57 new national unions formed by revolt. . . . In 20 [of those cases] the new national union still exists. Almost all of these revolts were against too conservative leadership. . . . This evidence does not prove that officers are usually less aggressive than the rank and file desire. There are two shortcomings to this evidence. One is the fact that a secession is likely to be the act of a minority which is unable to win control of the union. The other is that

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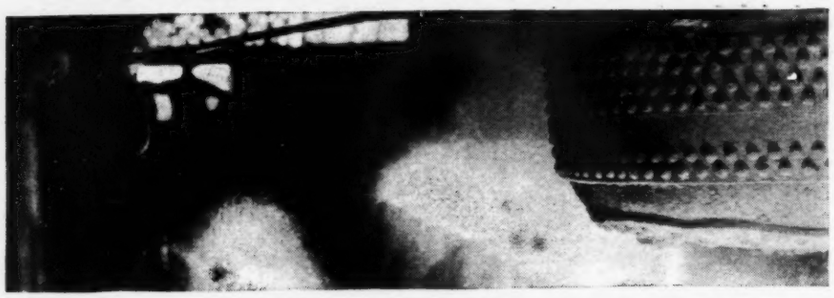

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conservative and cautious leadership is the very kind which the rank and file find easiest to defeat. Leaders who are too aggressive for the members are precisely the ones who are hardest to displace.

When wage increases are in the air and are receiving much publicity, the usual considerations may have little influence upon the decisions of union officers. They may consider it necessary to insist upon the prevailing increase regardless of the effect upon the future bargaining prospects of the union, the future employment outlook for the members, or even the willingness of the employers to fight. The prestige of unions and leaders is at stake. When it is, the long-run interests of the members or of the union may carry little weight.

Unions use certain criteria in support of their wage demands. These criteria do not determine how much the union demands; they simply determine how the union justifies its demands. Let us see what some of them are.

WAGES TO MEET LIVING COSTS

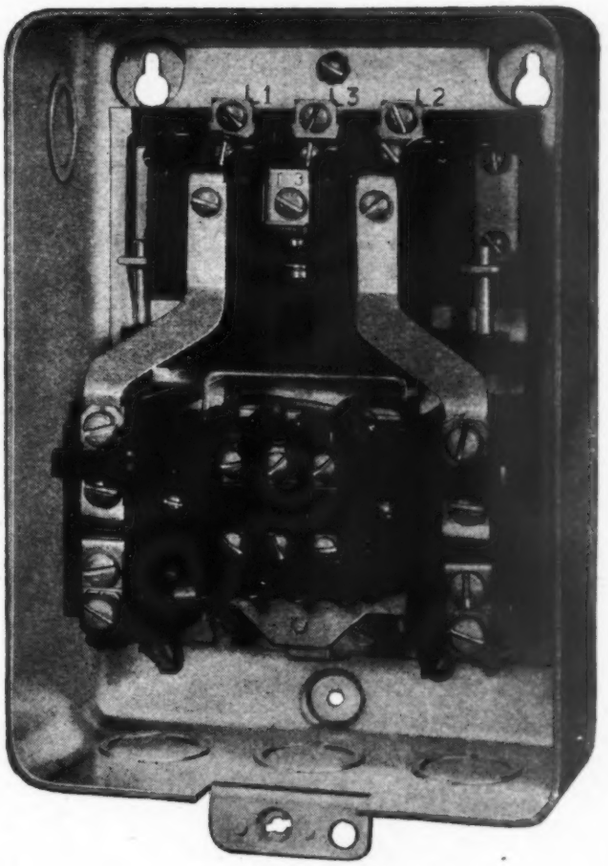
When the cost of living is rising, unions ask for wage increases to offset the rise in the cost of living. This seems like a reasonable demand, for it is merely an attempt to avert a drop in real wages. Nevertheless, if all groups attempted to prevent a drop in real wages by raising money wages as the cost of living increased, their efforts would fail. A rise in the cost of living means that the demand for goods is outrunning the supply. Increases in wages would aggravate the difficulty rather than correct it—they would make demand outrun supply more than ever and this would make the cost of living continue to rise. The remedy for a rising cost of living is not higher wages but more efficiency.

Most discussed and least understood among wage criteria is ability to pay. This is more often the employer's argument than the union's. Indeed, the constitutions of many unions require the union to seek to establish wage rates within given markets. Uniformity is, of course, incompatible with ability to pay. Even in the General Motors case, ability to pay was not the positive basis for the union's demand. The union based its claim upon the argument that an increase in the price of labor was needed to avert a catastrophic drop in post-war markets. Merely by way of anticipatory rebuttal did the union argue that General Motors could afford to pay the increase demanded.

Another basis for demanding higher

YOU'VE SEEN THIS ANNOUNCEMENT OF THE MASTER MOTOR STARTER

Now The Lid's Off



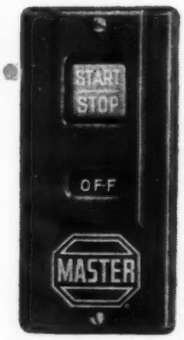
Master Motor Starters have a great many distinguishing features which are quite evident when you remove the cover . . . so here is *an inside view* showing a few of the basic design innovations. (Across-the-line AC magnetic starter, Form B-1, requiring remote control station.)

Clean Design — From a glance at this interior you will appreciate the orderliness of layout and compactness of the entire assembly.

Simple Construction — All terminals and mounting screws easily accessible from the front. Heaters for overload relays also readily accessible.

Rugged Assembly — Exemplified by sturdy formed straps rather than flexible wire as jumpers from overload relays to contact terminals for added rigidity.

Ease of Installation and Maintenance
No trick arrangements to puzzle electricians. Starters for remote control have barrier type terminal boards with control connections plainly marked and with complete wiring instructions inside cover. All contacts are easily replaceable without removing mechanism from the case.



PUSH-BUTTON CONTROL

Master Single-Button Type—An exclusive Master feature is the single push-button which is used for both starting and stopping, and which has a signal flag to indicate whether the motor is "on" or "off." The illustration shows the remote control station with single push-button and indicator flag The start-stop single button is also used where control integral with the starter is desired.

Conventional Two-Button Type—For applications where multiple remote control of a single starter is desired, the conventional two-button control can be furnished. *Write for Master Bulletin 200.*

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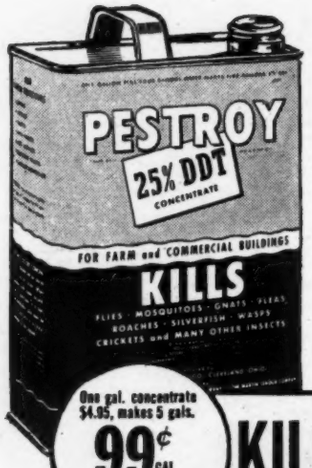

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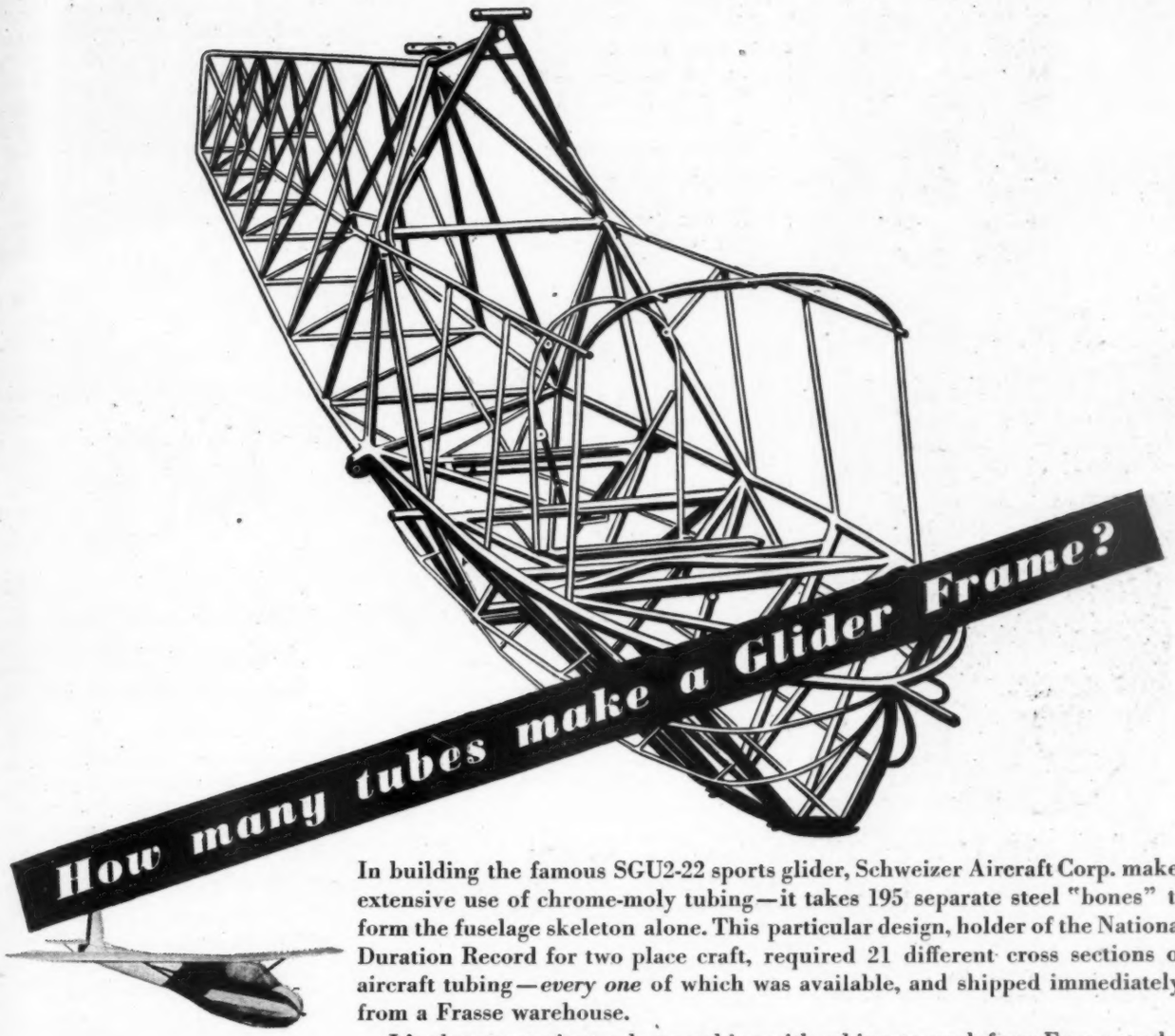
wages is an increase in productivity. Advances in the general wage level must, in the long run, be pretty completely the result of increases in productivity, because there is little opportunity for labor to gain by increasing its share in the national product at the expense of property. Only about one fifth of the national income goes to property. Gains in productivity which are the result of improvements in the skill or effort of workers are, of course, a sound basis for wage increases. Quite different, however, is the case of increases in productivity resulting from technological progress. One's first reaction might be that technological progress in an industry or occupation furnishes a reasonable basis for increasing the wages of people in the industry or occupation. A little reflection, however, will show that this policy, if carried very far, would soon result in a badly distorted wage structure.

PRODUCTIVITY NO BASIS

The rate of technological progress varies greatly in different industries. Among 38 manufacturing industries, for example, output per man-hour rose more than fourfold between 1909 and 1937 in two and less than 67 percent in seven. If wages were increased as productivity rose, they would soon have little relationship to the skill and responsibility required of the workers. As a matter of fact, the movement of wages in free markets shows little relationship to increases in physical productivity. Among 38 manufacturing industries, increases in hourly earnings between 1909 and 1937 varied from less than 150 percent in nine cases to more than 250 percent in twelve cases. The coefficient of rank correlation between increases in physical productivity and increases in hourly earnings was only about 0.05. This is what one would expect, because, as soon as wages in an industry become high relative to others, labor is attracted into that industry.

The adjustment of prices and wages to technological progress needs to be slow enough to provide sufficient investment opportunities to absorb the volume of investment-seeking funds that would be generated at a satisfactory level of employment. Otherwise a satisfactory level of employment will never be reached. The spread of unionism means that the labor market is being organized to make the reservation prices of labor more sensitive to changes in the demand for labor. The response of union reservation prices to increases in the demand for labor might conceivably



How many tubes make a Glider Frame?

In building the famous SGU2-22 sports glider, Schweizer Aircraft Corp. makes extensive use of chrome-moly tubing—it takes 195 separate steel "bones" to form the fuselage skeleton alone. This particular design, holder of the National Duration Record for two place craft, required 21 different cross sections of aircraft tubing—*every one* of which was available, and shipped immediately, from a Frasse warehouse.

It's *that* convenient, when working with tubing, to work from Frasse stocks. Frasse is a warehouse specialist in tubing—not only in aircraft grades, but in carbon mechanical and stainless as well.

Frasse stocks of seamless mechanical tubing alone range from 3/32" all the way up to 10½" O.D.—not to mention the square tubing, condenser tube, or welded. In stainless steel you can get any one of three types—304, 316, or 347—in both tubing and pipe, right out of warehouse stock. All grades are maintained in broad, convenient size ranges.

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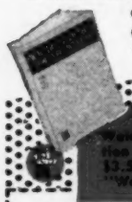

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be so prompt that no increase in employment would result.

Under collective bargaining, wages in different occupations or industries will vary with the relative bargaining power of the parties—which may be defined as the cost to one party of exacting a concession from the other. Wages under collective bargaining tend to be set at the point which equates the willingness of the two parties to fight—that is, at the point below which the union's willingness to stand a shutdown exceeds the employer's and above which the employer's willingness exceeds the union's. . . .

There is no reason to expect [this clash] to produce either (1) the structure of wages or (2) the behavior of wages that would maximize the national income.

UNIVERSITY COURSES IN SAFETY ENGINEERING

Sponsored jointly by the college and the National Safety Council, Georgia School of Technology has organized a Department of Safety Engineering. Objective is to make available to industry "trained personnel for the control of its accident and health problems."

Basic course qualifies graduate as "safety technician," calls for 990 hours of study over 9 quarters, includes industrial safety, machinery safeguards, fire prevention and control, and industrial hygiene.

At the request of local industries, a special 50-hour course is being organized for experienced safety supervisors and inspectors. Representatives of casualty insurance companies will be invited to attend. In addition, plans are under way for the establishment of evening classes in industrial safety at plants in Savannah.

Similar departments are said to be now in operation or under consideration at New York University, Illinois Institute of Technology, and the University of California.

LABOR DEPARTMENT HELD IN NEED OF REVISION

Reorganization of the U. S. Department of Labor is needed to correct the swing of the pendulum against management, according to Herman W. Steinkraus, president of the Bridgeport Brass Company. A Department of Labor and Industry, he

Prepare UNIT HEATERS For Winter Operation Now

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No. 9 HG
1/4 HP — 15,500 RPM
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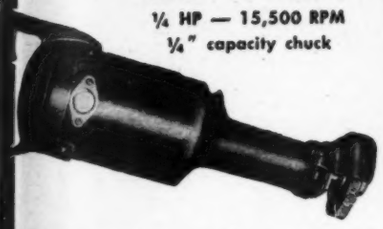
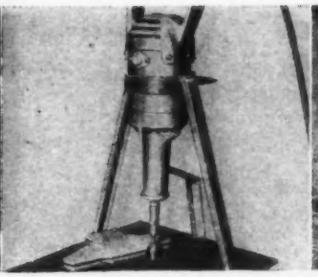


Cleaning Welded Joints



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Spark-Testing Steel

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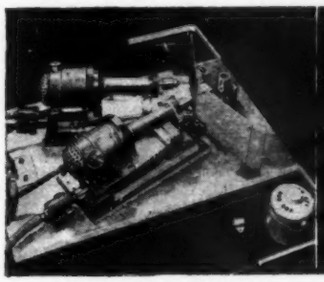

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Touching-Up a Forging Die

De-Burring Gear Teeth

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1/20 HP—18,000 RPM
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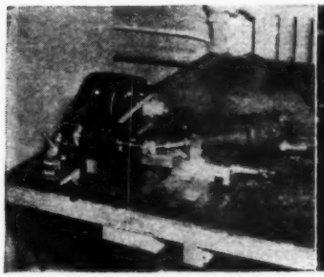

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Finishing Plastic Mold

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Its rugged durability guarantees efficient, trouble-free service

When you have a job that requires a good handgrinder, select a Dumore. Grinding is only the first of many jobs you can do with these versatile tools. They have scores of other applications (a few illustrated on this page) — polishing, finishing, sanding, burring, scoring, touching up, drilling, milling, and many more.

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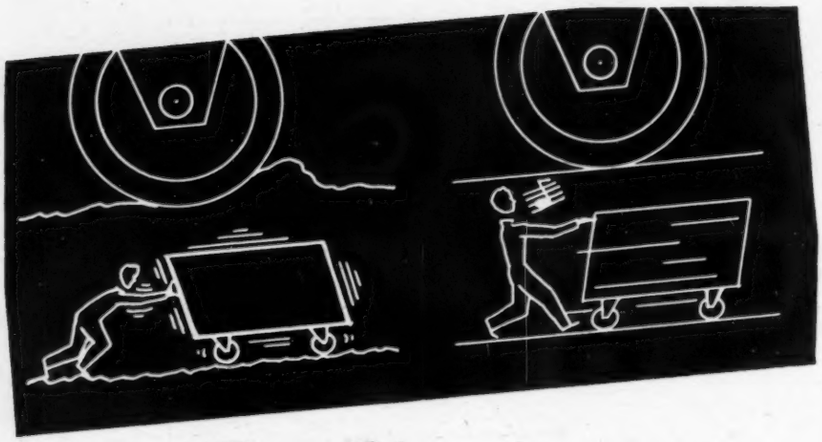


Actual Tests Show—**That it takes 100% more energy to push a 1400-lb. truck on dirty floors!**

Actual tests were made at an Akron rubber plant to determine the pull needed to keep a 1430-lb. hand truck, loaded with fabric-covered hose, rolling on a 10-month accumulation of bumpy, rubbery, tar-like grime. After cleaning the floor with a Tennant Model K only HALF as much pull was required for the *same* load!

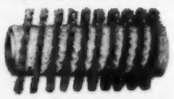
The fast, hard-cutting Revo-Tool attachment on the Model K sheared off this tough, tar-like crust, leaving a clean, smooth floor for easy trucking. With a Tennant Floor Machine the ten-month accumulation of hard-packed rubber, soapstone, dirt and grime *vanished like magic.*

FEATURES

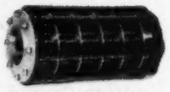
- **REQUIRES ONLY 1 MAN.**
- **PICKS UP SOILAGE** as it goes. Avoids extra sweeping.
- **SMOOTHS AND LEVELS** surface as it cleans. Leaves floor hard, dry, ready for traffic.
- **ELIMINATES CHEMICALS** or need for soap and water.
- **NO INTERFERENCE** with normal plant operations.

CLEAN FLOORS... Make EASY TRUCKING... Cut MAINTENANCE COSTS...

You too can speed up your trucking and cut floor maintenance costs with a Tennant Industrial Floor Machine. It **cuts grime loose, picks up soilage and smooths and levels** the floor—all in *one, fast, easy, one-man operation!*



STEEL WIRE BRUSH . . . Twisted tufts of strong steel wire, mounted in diagonal pattern, won't clog or streak. Brush is easily reversible for self-sharpening.



NEW REVO-TOOL . . . Has tough alloy-steel cutters for a scarifying-pulverizing action in cleaning and leveling floors. Speedy hammermill action cuts encrusted grime.

WRITE FOR INSPECTION OF YOUR FLOORS. NO OBLIGATION.

The way to finer floors TENNANT Floor Maintenance System

G. H. TENNANT CO.
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held, would be an impartial compiler of statistics, continuing:

"Too often, in recent years, such statistics seem to have been compiled with a definite slant, rather than with an impartial presentation of the facts."

A revamped Labor Department, Steinkraus said, would promote industrial peace through conciliation, mediation, and voluntary arbitration. Two of his other proposals for industrial peace:

1. Revise state labor laws to facilitate settlement of labor disputes on a local rather than a national basis.

2. Form joint committees of leading citizens, manufacturers, union leaders, and employees to discuss local problems of labor, management, and the community.

Noting that the recent trend in labor conflicts was toward bargaining on a national basis, he asserted, "This is a trend to be resisted. Washington was called in on many disputes before state and local means were exhausted. Some states have excellent legislation on their books, Minnesota, for example, and have set up splendid departments to assist both labor and management. But many have not."

FOREMEN-WORKER UNIONS FROWNED ON BY COURT

Federal Circuit Court (Cincinnati) upheld Wagner Act privileges for foremen belonging to an independent union at Packard, but at the same time went out of its way to point out that the opposite situation exists at the two mines of Jones & Laughlin, where the NLRB has certified a union which also speaks for the production workers.

Court held it is "not appropriate" for supervisors to be subject to discipline by a union that is controlled by the men they supervise.

REAL WEEKLY EARNINGS AT PEACETIME PEAK

The amount of goods and services that can be bought with dollar weekly earnings—*real* wages— soared to new peacetime highs during the summer. National Industrial Conference Board survey of 25 industries reports average weekly income adjusted for cost of living was off 8.1 percent from

a Sensational NEW Abrasive

32 Alundum*

It's an entirely new type of aluminum oxide abrasive — made differently by a Norton-invented and Norton patented process.

Each grain is a single, complete crystal — individually produced in the electric furnace — not crushed to size.

Each crystal is strong and solid in shape and with many sharp points for faster, cooler cutting.

Stock wheels for surface, tool and internal grinding available now — other types soon.

Write for additional information or, better still, call in your Norton abrasive engineer or Norton distributor.

Cuts deeper and faster

Cuts freer without burning

Requires fewer dressings

Gives longer wheel life

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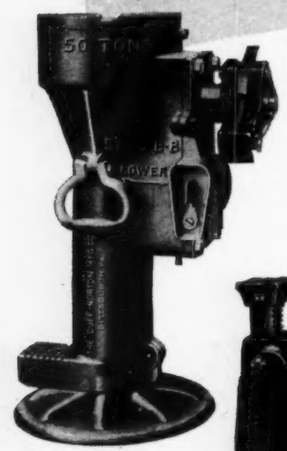
DUFF-NORTON JACKS

10 POINTS
TO CONSIDER IN JACK SELECTION

1. Load to be lifted
2. Speed of lifting desired
3. Type of lowering
4. Height and "raise" required
5. Weight of the jack
6. Constant or intermittent service
7. Outdoor or indoor application
8. Close quarters or unlimited room
9. Need for foot-lift
10. Cost

THE *BEST* ON EVERY COUNT!



HUSKY

EASY TO OPERATE

POWERFUL

From the *complete,* dependable line of Duff-Norton safe, easy-to-operate jacks, you'll find a *jack for every job!*

When you specify jacks, be sure you pick the right jacks for the job—then you'll get top performance and complete satisfaction. Use the 10-point selector chart as your guide. Your INDUSTRIAL DISTRIBUTOR will be glad to check over your jack requirements and show you why Duff-Norton Jacks are *best* on every count!

Call your industrial distributor today—or write direct to Duff-Norton for complete descriptive bulletins.

DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.
PITTSBURGH 30, PA.
There Is a Representative Near You

June, 1945—hours were off 12.4 percent for the same period—but was *up* 21.5 percent from January, 1941.

Other comparisons—real wages have risen 33.1 percent since August, 1939 (start of World War II), and 51.6 percent since prosperous 1929. Average *hourly* wages have risen 65.1 and 101.5 percent over the same periods. Actual average hourly rate in June, 1946, was $1.189, up 56.7 percent from January, 1941, base date of the Little Steel formula.

WHY UNIONS FEAR INCENTIVE PAY PLANS

Alleged prevalence of rate-cutting was found to be the dominant reason for union opposition to incentive wage plans, according to a survey just completed by the National Industrial Conference Board.

However, industrial engineers representing *both* labor and management were found to be in substantial agreement on the following points:

1. Obtain real agreement between management and labor before adopting or modifying an incentive plan.
2. Make incentive pay objectives proportional to the opportunity for accomplishment.
3. Administer the wage incentive fairly. Avoid being swayed by accidental or temporary circumstances. This requires the continued attention of top management.
4. Protect incentive systems against uncontrollable losses of time, but do not pay for idle time.

HOUSING SHORTAGES AFFECTS TRANSFER POLICIES

What management is doing to help transferred employees find new locations in the face of the housing shortage is reported by the National Industrial Conference Board after a survey of 49 companies with nationwide operations. Breakdown of specific practices is as follows:

Pay all transportation expenses of employee and family—34.

Absorb costs of moving employees' household goods—28.

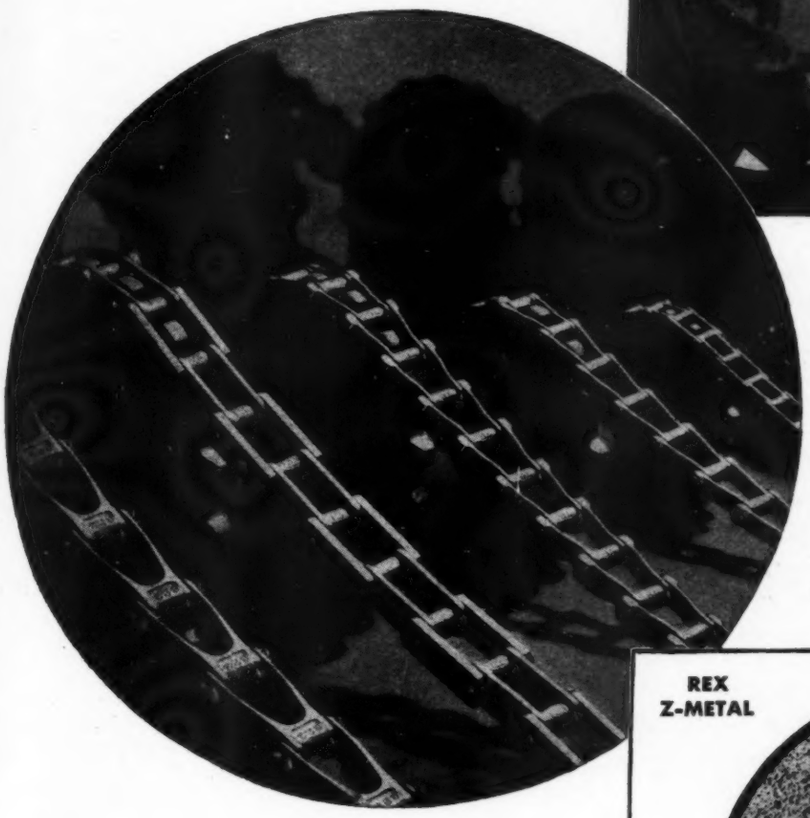
Pay hotel expenses for employee until housing is located—35.

Allow hotel expenses for employees' entire families—20.

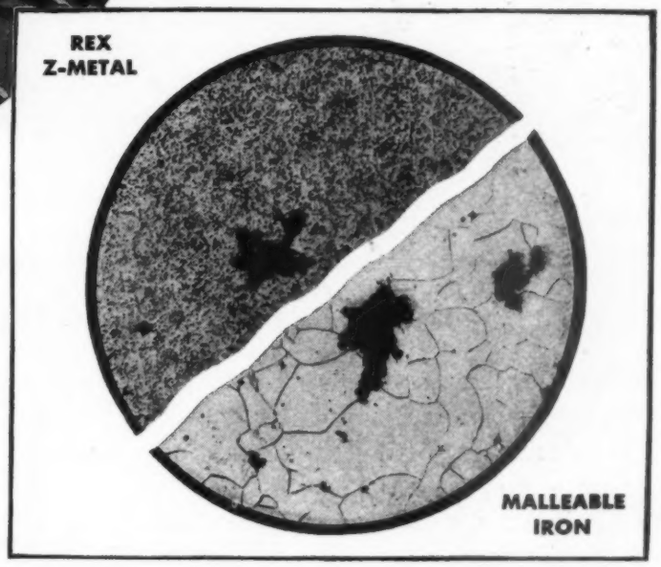
Other practices generally followed or gaining in popularity as aids to the transferred employee are: Permit

CHAIN BELTS THAT LIVE A DOUBLE LIFE!

① AND IN MANY CASES, more than double! For Rex Z-Metal chain belts have added toughness, added strength, added resistance to corrosion and abrasion that make them last far longer than standard malleable chains.



② THE COMPLETE LINE of Rex cast chains is available in Rex Z-Metal—the cast ferrous metal that gives them the hidden qualities that make them ideal for toughest drive and conveyor service. In virtually every industry . . . wherever heavy loads or dirty, moist or corrosive operating conditions are encountered, you'll find Rex Z-Metal chain belts.



③ AND HERE'S A VIEW of those hidden qualities. Precise, carefully-controlled heat-treatment imparts superior hardness and a matrix of ductile iron with spheroidal particles of iron carbide uniformly distributed throughout that assures the greater strength of Z-Metal. (Photomicrograph magnified 200 X.) For all the facts, write for your copy of Bulletin 437.

REX CHAIN BELTS *manufactured in every available type for the positive transmission of power, timing of operations and conveying of materials*

CHAIN BELT COMPANY OF MILWAUKEE • 1667 W. Bruce Street, Milwaukee 4, Wis.

In hand or on stand
ONE electric drill does the job

When you buy a Stanley Electric Drill you get two highly efficient tools for the price of one . . . for the Stanley Drill operates with speed and accuracy in the stand as a bench drill or separately as a portable drill.

This extra utility, double-duty drill, gives you double your money's worth. Write for folder on complete line. Stanley Electric Tools, New Britain, Connecticut.

STANLEY
Trade Mark
HARDWARE · HAND TOOLS · ELECTRIC TOOLS

frequent trips back home at company expense until housing is located—one company pays for such trips every two weeks. Protect employees from "quick sale" losses incurred when they must sell property. Pay expenses connected with the liquidation of rental leases. Advance loans to transferred employees as down payments for purchasing property — through direct loans, long term low interest loans from the "employee loan fund," or by the company taking a second mortgage. Set up a "housing bureau" with one or more full-time employees to aid in the location of homes. Absorb incidental costs of moving such as new license plates, local transportation and telephone while looking for a place to live, cleaning new residence in preparation for occupancy.

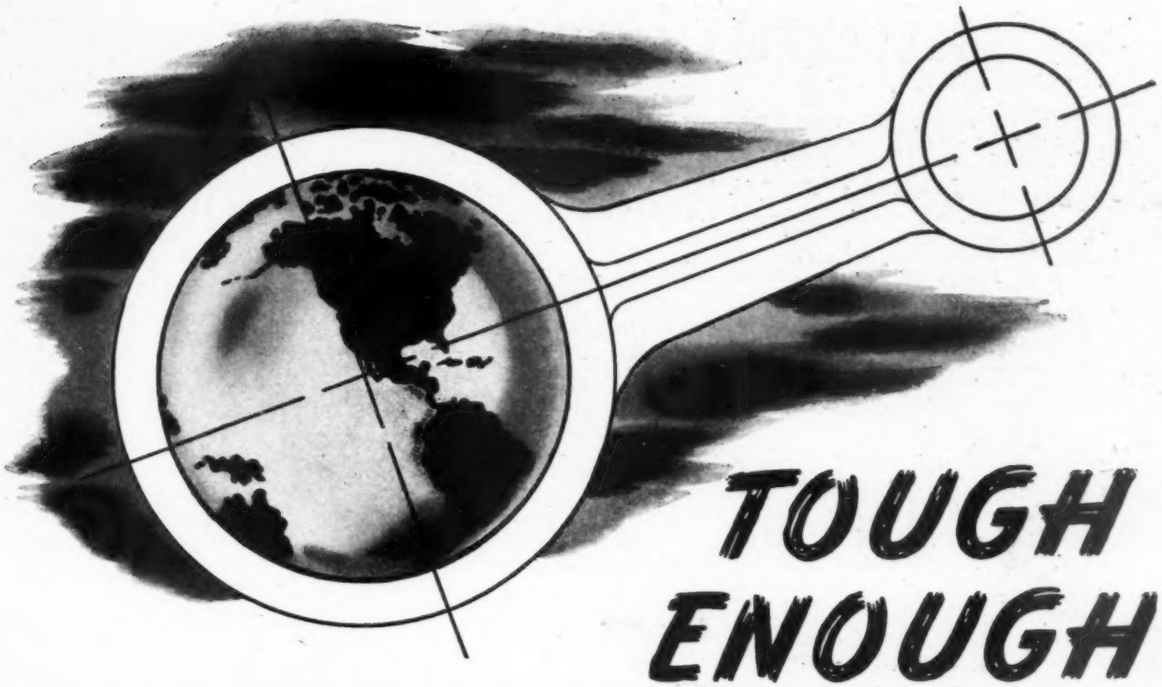
All firms surveyed agree that employees should suffer no financial loss through a transfer initiated by the company.

Behind the Byline

Facts About *Factory's* Authors

M. G. Kershaw (page 90) attended the Drexel Institute of Technology and was then a draftsman for Lewis, Robinson & Gant. Following brief army service in the First World War he returned to his former employers as a sales engineer, remaining in this position until September, 1923. At that time he joined the Du Pont Company as a draftsman and later became a designer. Since 1927 he has been senior engineer in charge of the heating and ventilating group in the design division of the engineering department. He has been a member of the American Society of Heating and Ventilating Engineers since 1921 and is president of the Philadelphia chapter of this society for the years 1946-1947.

One of the hobbies of E. F. Sharpe (page 98), who is a man of many hobbies, is making things "click." He is strongly interested in safety work and, as demonstrated in his article, is making safety work in his plant. He has been in and out of his own businesses (a



TOUGH ENOUGH

for any job !

"600" Metal has proved to be the answer to hundreds of problems involving the toughest and most exacting applications during the war. The ever-changing demands calling for bearing alloys that will stand up under increased speed, intensive shock and steady pounding have greatly widened the fields of application for "600" Metal.

Among the list of users of "600" Metal are leading manufacturers of electrical equipment, pumps of all types, engines and other power units, aircraft, automotive equipment, machine tools, control apparatus, ships and marine hardware, packaging machinery and many others.

"600" Metal is available in the form of rod, forgings and tubes. Unlike many other alloys, "600" Metal has a consistent, uniform grain structure in rod of large as well as small diameters.

Primarily where a bearing is subjected to a reciprocating motion, reduction in weight is essential to keep vibration at a minimum and to assure maximum efficiency. Because "600" Metal is stronger per unit of weight, parts can be made of equal strength out of "600" Metal with a REDUCTION OF 10% TO 35% IN THE WEIGHT OF THE FINISHED PART.

"600" Bearing Metal has superlative bearing and non-corrosive properties, and although it contains no tin, it fulfills the same services.

Write us if you have a bearing problem. "600" Alloy may be the very solution. Complete literature is available.

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600
BEARING METAL

MUELLER BRASS CO.
PORT HURON, MICHIGAN

AIRETOOL suggests

check your

TUBE CLEANING

equipment now

Meeting emergencies with the proper Airetool Tube Cleaning and Tube Expander equipment on hand saves "down time." Maintain an adequate supply of cutter-heads, cutters, universal joints, motors, spare hose, expanders and mandrels. To be safe check all your tube requirements against the cleaners and expanders you have—there should be one or more for every type of job.

Write Dept. FM for bulletins or information on any tube cleaning or tube expander jobs for which you need *EXACT* equipment.

AIRETOOL

MANUFACTURING COMPANY

SPRINGFIELD, OHIO

for a PERFECT CONVENTION

in Suburban Chicago – or a

HAPPY HOLIDAY

HIGHLAND PARK ILLINOIS

32 MINUTES TO CHICAGO BY FAST TRAIN

Conventions at the MORAINE HOTEL afford the happy combination of concentrated effort and luxurious rest.

Of graceful Georgian architecture and early American appointments, in an inspiring setting of ravine woodland on the shores of Lake Michigan, the MORAINE just naturally makes business a pleasure.

Our facilities conveniently accommodate groups up to 150 persons . . . Memberships are available in our popular Beach Club . . . Additional information will gladly be submitted upon request.

HOTEL *Moraine* -ON-THE-LAKE

HIGHLAND PARK, ILLINOIS

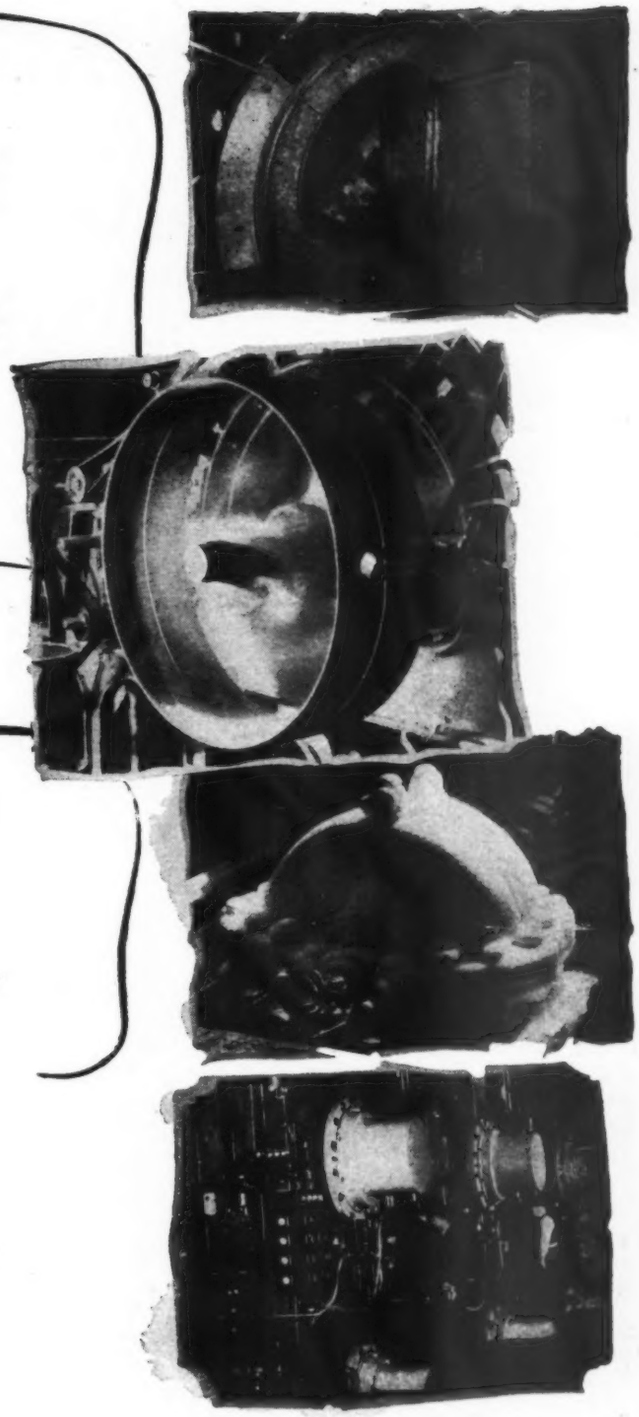
forging plant, second-hand machinery, contracting), and in 1927 found himself successful enough to retire. During the depression he became available for regular employment again. He belongs to the American Society of Engineers and the Engineers' Branch of the Chicago Safety Council. Another one of his hobbies is fishing, and still another one, he admits, is telling tales that are tall about the art.

G. T. Mitchell (page 106) graduated from the University of Minnesota with a B. S. in Mechanical Engineering. He became a qualified machinist by part-time employment during school years. He had six years of industrial engineering with Aluminum Company of America, including development work of special extrusion practices and control measures. During the war he helped train industrial engineers. He has been with Ozalid since 1943 and has contributed to many design and development projects there. His hobbies are constructing toys, handling a boy scout troop, and providing mechanical advice for his own and neighborhood children, who are building and racing half-size gasoline automobiles.

The practical experience, so eminently shown in G. S. Stringer's work scheduling article (page 110), is backed up by 13 years of diversified experience in design of plants, power and light, planning for industrial manufacturing operations, stock control methods and procedures, planning, scheduling, and testing of materials, cost analysis work, and plant operations. He holds B. S. and M. S. degrees in engineering from Columbia College & Engineering School, and is a member of Columbia Engineering Alumni Association. He concentrates all his hobby interests in one sport—fishing.

Dale Jones (page 118) graduated from Oklahoma A&M College with a degree in industrial engineering. Since coming East he has kept abreast of

"Bearings RUN 10% COOLER



SINCE CHANGING TO Tycol industrial Greases"

"Production speeded 65%...
Repair costs slashed 30%...
Deposits eliminated...
Highly stable—doesn't leak...
Consumption cut 25%..."

This report from a plant engineer typifies the kind of trouble-free, cost-cutting lubrication provided by Tycol Industrial greases. They contain more high-grade cylinder oil — less soap — which means better performance in every application.

For aid in the selection of Tycol greases best suited for your particular needs, contact your nearest Tide Water Associated office today.

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In many businesses, the handling of materials has grown on a "hap-hazard" basis, as the business has grown. If this is true in your case, you will be surprised at how much your whole production program can be speeded up—and your handling costs reduced—by a properly engineered materials handling system and selection of trucks *exactly* suited to each type of work. More than 1,000 truck designs have been developed in the Nutting line because they were needed.

Let a Nutting Engineer Help You Select the Right Truck for each Job

Call in a Nutting Sales Engineer,—let him, backed by the Nutting factory, make you recommendations for more efficient materials handling. Consult the classified section of your phone directory, or write us direct.

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curricular developments in his field with advanced courses at New York University. He is a member of Sigma Chi and Sigma Tau honorary engineering fraternity. First employed by RCA, Harrison, N. J., he transferred to Johns-Manville Corporation and is now senior industrial engineer. He reports that his usual pastimes are fishing and writing.

Wendell B. Wisecarver (page 122) was born in Des Moines, Iowa, July 12, 1913. He graduated from high school there and went to work for the Des Moines plant of Swift and Company. Eight years with their standards department gave him training and foundation in his special field of interest. Three years were then spent at National Battery Company, during which time he installed a new time study system and control plan for various National Battery plants. In 1944 he came to Minneapolis-Honeywell as time study engineer, and was instrumental in creating the new time study system and cost control plan that is now known as the M-H Measurement Plan.

Two and a half years ago, Harold S. Bown (page 127) joined Lake Shore Tire & Rubber Company to establish that company's present industrial engineering department. Behind that move were 17 years of varied experience in the rubber industry. He has worked through drafting, timekeeping, personnel, and industrial engineering departments. Bown graduated from Ohio State University in 1925 with a B. S. degree in business administration. Later, while holding a full-time job, he obtained a master's degree at Northwestern University. Spare time often finds him behind a camera, focusing a lens either on his family or industrial views of particular interest.

In view of the fact that writing is his chief hobby, it is only natural that Dwight DW Davis (page 132), contributor of more than 40 articles to national mag-

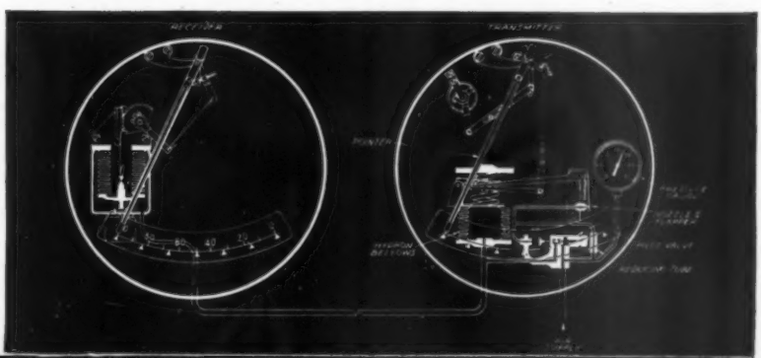
With this remote control system, you are assured of on-the-spot accuracy and responsiveness up to 1000 feet away *or more*. In addition – temperature, pressure, flow or liquid level control can be centralized at a convenient point with complete absence of fire hazard or high pressure runs.

In this system of remote measurement and control, better-engineered Foxboro Instruments are used throughout. The complete system consists of a pilot-operated Transmitter to give positive power, and one or more Receivers connected by a single air line. This connection is made inexpensively with ¼" O.D. copper tubing.

The functioning of the Transmitter and Receiver is exactly matched for high accuracy. At the slightest change in measurement, the Transmitter changes the air pressure, and the pressure-calibrated element in the Receiver accurately measures the change.

If you are planning to improve the efficiency and safety factors of your plant through centralized control – investigate the important advantages offered by Foxboro Pneumatic Remote Measurement and Control. Write for Bulletin A 307-1, **The Foxboro Company, 24 Neponset Avenue, Foxboro, Mass., U. S. A.**

The interior construction of the Foxboro Receiver and Transmitter is illustrated in the diagram at the right. Both instruments are certified for accuracy and response. Certification is possible because the mechanisms employed have been proved successful by thousands of installations.



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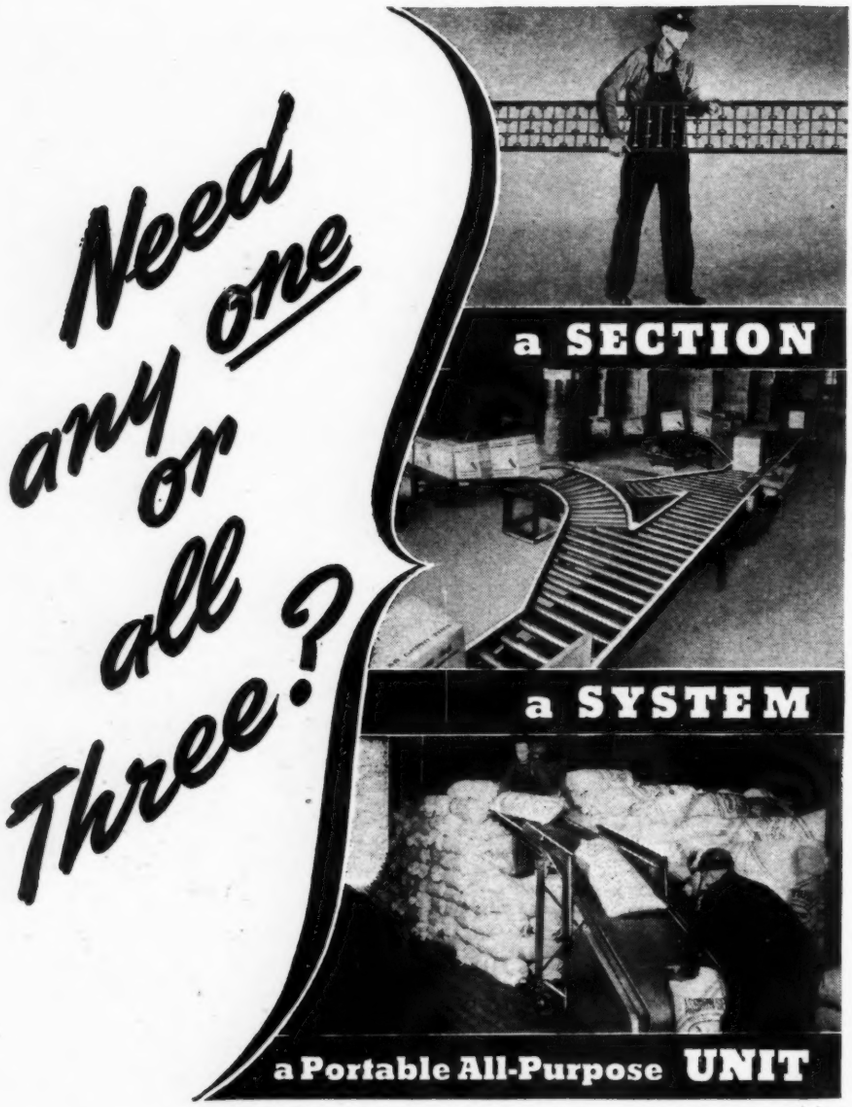
REG. U. S. PAT. OFF.
PNEUMATIC TRANSMISSION
For Remote Measurement and Control



THE range and versatility of Standard Conveyor equipment is the result of nearly 40 years of close contact with conveying problems — large and small installations.

If you need just a light, portable section of conveyor to speed handling in warehouse or on shipping platform — complete, continuous flow system linking manufacturing or packaging operations — or a portable unit to speed handling in storage and shipping areas — Standard Conveyor Company can supply you with any one or all three.

Write for "Conveyors by Standard" Bulletin No. FP-66 — a valuable conveyor reference book that will be useful to you.

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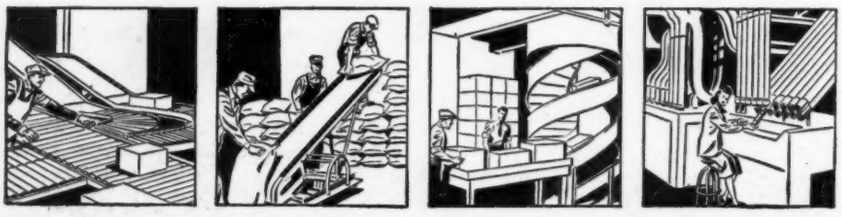

ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

azines, has added FACTORY to the growing list. His work experience includes longshoreman, miner, carpenter, and the many intermediate advancements incident to his becoming a college professor of social science. At the present time he is industrial psychologist at the Illinois Watch Case Company. His Ph.D. degree heads an academic record involving work at two colleges and four universities. Memberships in societies include National Vocational Guidance Association, Phi Delta Kappa, Chicago Guidance and Personnel Association, American Academy of Political and Social Science, Chicago Industrial Relations Association. Some of his spare time is set aside for hunting, golf, and swimming. His most particular interest, however, is two lively daughters, ages seven and five.

H. W. Knox (page 138) was born on a farm in Indiana. After grade school and high school, he received his B. S. degree in engineering from the Rose Polytechnic Institute, Terre Haute. In 1917 he entered the Navy, and at the time of his discharge had risen to the grade of ensign. He came to The American Laundry Machinery Company, where he is now superintendent, in 1926. He is a member of the Society for Advancement of Management. His spare time is divided between his various hobbies, which are hunting, fishing, and playing bridge.

Marshall P. Fox (page 140) reports a case study on the success of a plant cafeteria at Container Corporation's Cleveland plant. As general manager he is able to cite frankly some of the interesting considerations involved in selling both employees and top management "a good thing." Fox has been associated with this company since 1933. He began work in Container Corporation's Chicago plant. He was transferred to Cleveland in 1938. After four years of work in this plant, he was promoted to his present position of general manager.

A native New Yorker, Frederick G. Bauer (page 142) received his engineer's training at New York University, from which he graduated with a degree of Bachelor of Mechanical Engineering.

ACCESSIBLE AIR HOSE SPEEDS PRODUCTION

Why put up with hose festooned from ceilings, sprawled over floors and benches. It's easy to keep your shop neat, increase your production, keep your workmen free from accident hazards and put air to work efficiently and economically. Just install a number of these streamlined "Tuck-Away"* Hose Reels, under or on benches, on walls, ceilings and at other convenient but out-of-the-way places. "Tuck-Away"* Reels work like window shades. Give the hose a tug and it rewinds. When in use a ratchet clutch holds the hose at desired length. Universal mounting (4 convenient positions) permits installation of Schrader Hose Reels in any spot in your shop. Write for a free copy of our new folder A9 describing our "Tuck-Away"* and large Hose Reels.

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IMO pumps provide the steady, pulsation-free delivery conducive to a steady flame and efficient combustion.

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BAN CUTS GREASE!

Simplify your general cleaning jobs by just remembering that vegetable and mineral grease *holds dirt to surfaces*, and that BAN cuts away *both* kinds of grease. BAN leaves cleaned areas spotless and shining—*free of dirt because they're free of grease.*

BAN's swift, sure chemical action takes the drudgery out of cleaning. Dissolve BAN in either soft or hard water, apply with cloth or mop, and rinse off. *That's all there is to your tough cleaning problems!*

Use BAN on wood, cement, magnesite, tile, on painted floors and woodwork, on rugs, marble, light bulbs, dishes—and wherever else you want a quick decision over grime. *BAN banishes dirt.*

Write for folder B746J.

The C. B. DOLGE CO.
WESTPORT, CONNECTICUT

During the war he served as chief of the gage laboratory in charge of procurement and inspection of measuring instruments and precision gages while assigned to the New York Ordnance District. Upon his return to United Chromium, after honorable discharge with the rank of major, he was assigned to represent the engineering department in supervising the installation of equipment in the new plant for the corporation's Organic Coatings Division at Carteret, N. J. His busy working career is rounded out with hobbies of golf and photography.

Fondness for variety in his work led John Penberthy (page 153) into maintenance. He was educated in England, where he took up power station operation. This was followed by courses in industrial electricity and plant maintenance. In the United States, he joined the maintenance department of R. Hoe & Co. He has been there 20 years, has liked the challenge that many types of maintenance problems pose, and is now plant maintenance superintendent. From his native Cornwall he brought a love of choral singing. This interest extends to semi-classical music in general. Spectator sports are now his chief hobby. He maintains a remarkable record for attending world series baseball when the games are held in New York, and he has seen his share of Army-Notre Dame football. In England he enthusiastically played cricket and rugby, but prefers U. S. sports now.

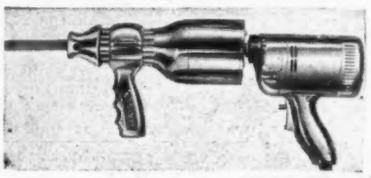
Strictly Philadelphian, Joseph H. Gillies (page 156) graduated from the local school system and then took various evening courses in technical and management subjects at Temple University and the University of Pennsylvania. He was associated with the D. B. Flower Company, Gardiner and Hepburn, and Norden-Hauck, Inc., before starting with Philco Corporation in June, 1929. With an average of a major advancement once every three years, he has worked in the following capacities: factory engineer, department head in charge of production development, assistant works manager, works manager, and since 1942 he has been vice-president in charge of radio production. He is a member of the engineer's club of Philadelphia, as well as the Institute of Radio Engineers.

Every Shop Needs These

3 HANDY TOOLS

Save Labor! Speed Production!

1—For Sawing and Filing . . .

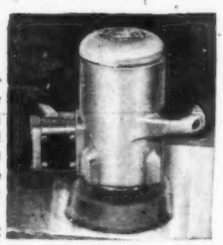


THE FAMOUS SAW-GUN
Portable Power Saw & File

Abolishes tiresome hand operations. Just pull the trigger and the Saw-Gun does the work! Speedily saws and files all metals, corrugated or plain, stainless or monel, also wood, plastics. Attaches directly to electric or air drill, or flexible shaft. Uses ordinary hack saw blade for sawing, regular machine file for filing. Reaches into tight places with ease. Ideal for panel notching and slotting. Portable. Rugged. Available with or without drill.

2—For Grinding and Sanding . . .

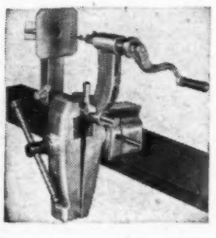
PORTABLE GRINDER



Does a faster, better job on all ordinary grinding and sanding operations, on all gauges of steel and other materials. Use it also for removing paint and rust. Three-phase motor starts at full speed. Has no gears, no brushes, no commutators. Outperforms and outlasts ordinary brush-type grinders. Completely portable. For 3-phase, 60 cycle, 230 volt operation. Three sizes, 1 h.p., 1½ h.p., 2 h.p. Either cup-wheel or edge-wheel type.

3—For Holding and Drilling . . .

TWIN-TOOL Combination VISE-DRILL



Amazing new multi-purpose tool. A Vise and Drill Combination handy for hundreds of jobs. Completely portable. Sets up anywhere. Ideal for field and road work. Use it as a horizontal or vertical drillpress; as a versatile vise; as an all-around drill; as a wheel-puller; as a broken stud remover. Vise swings on vertical axis, turns to any angle. Drill bores hardest steel, glass, etc. Equipped with ratchet handle. V-block for holding objects, extra pipe jaws for pipe ⅜" to 5". Sturdy, yet light in weight.

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for top speed work in tough die steels

Do your cutting in tough die steels—at *high speed*—with T-J Die Sinking Milling Cutters! Designed and built *right* for sturdiness...ability to hold a sharp edge longer...and carry less breakage percentage. *More work between grinds!* Made from a standard, extremely high grade steel . . . *better performance* because of extra strength, wear resistance and uniformity. Backed by 29 years of T-J experience. Write for catalog. The Tomkins-Johnson Company, Jackson, Michigan.

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

DIE SINKING MILLING CUTTERS

LOOKING FOR A WIPER THAT'S EASY ON POLISHED STEEL? ...then try "KEX" WIPING CLOTHS

KEX Wiping Cloths are soft and safe. They have no abrasive dirt—no buttons, hard seams, etc.—to dig into delicate finishes. And every square inch of a KEX Wiping Cloth is *wiping* surface—hundreds of more wipes per pound over ordinary waste or rags.

KEX Wiping Cloths are uniform in size—distribution is easier to control. And fresh KEX Wiping Cloths—chemically cleansed by a *special* high-heat process—are delivered as often as needed. You always have plenty of clean KEX Wiping Cloths on hand.

Rent KEX Wiping Cloths and Figure Your Profits

Try the KEX Wiping Cloth system, today! There's nothing to buy, no expensive inventory—just a low monthly rental. And the very first month should show a considerable saving on wiping costs. For complete information, phone your local KEX representative—
—or write KEX National Service, 295 Fifth Avenue, New York 16, N.Y.

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How CIO and AFL Stand on Current Issues

The following report analyzes CIO and AFL positions on various issues and forecasts trends of union activity. The report is based on discussions at three recent meetings—(1) PAC with its field representatives and CIO regional directors, (2) CIO executives with a hundred or more top officials of the various international unions, (3) the regular quarterly session of the AFL executive council.

1. A SECOND LABOR-MANAGEMENT CONFERENCE

CIO—Since July 18, when it was first proposed, the need has increased for President Truman to call a conference of labor and management "to the end that the demand and need for immediate wage increases may be given full and official recognition, and to the end that the crisis created by the drive to cripple and destroy price control may be met quickly through adequate guarantees for a stabilized national economy." Government must play a greater part in this conference than it did in the one held last November.

AFL—"We doubt the wisdom of such action. It would not be productive of good results. We prefer to work out agreements with employers through collective bargaining, free from government intervention and control."

Comment—The AFL deals mostly with small employers, many of whom do not come under price ceilings or who can absorb wage increases. It was able, without strikes, to negotiate many increases under the wage-price policy existing before the end of the steel strike in mid-February. It blames the CIO for fracturing the wage-price policy, through what it calls political industry-wide strikes, and for the precipitate rise in cost of living that followed the revised policy necessitated by settlement of the steel strike. Inherently opposed to government interference in labor relations, the AFL doesn't like CIO's repeated reliance on government assistance. It will be recalled that the AFL (and its then returning prodigal son, John Lewis) joined industry spokesmen in resisting CIO efforts to have the last labor-management conference fix a post-war wage pattern.

2. PRICE CONTROL

CIO—The February 14 wage-price policy has been administered tightly

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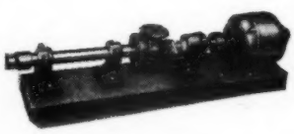
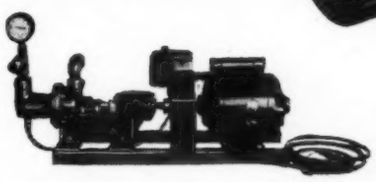
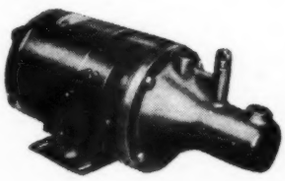


Small-capacity, high-pressure Moyno pump. Rating: 5 g.p.m. at 400 p.s.i.

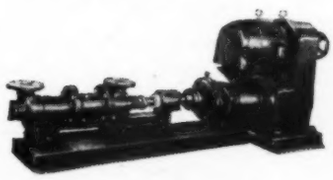


Reversible Moyno complete with accessories, used for filling tractor tires with liquid.

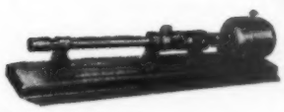
Belt-driven Moyno. This design is the accepted pump in the enameling industry.



Close-coupled Moyno and motor. Overall length, 15". Built-in relief valve. Pumps one g.p.m. at 100 p.s.i.



Heavy-duty Moyno with variable speed drive. Excellent for metering highly viscous materials.



10 g.p.m. Moyno for high-pressure degreasing up to 500 p.s.i.

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as to wages and, to appease Congress in hopes of getting OPA extension beyond June 30, very loosely as to prices. Decontrol was put into high gear. Result—the BLS Consumer's Price Index, which had risen 2 percent in the year preceding last February, jumped 3 percent between February and June, and 5½ percent between mid-June and mid-July. Program of action: (a) Increase consumer resistance to rising prices through buyers' strikes, (b) demand most rigorous price control policy permissible under the new law, (c) restore subsidies until April 1, 1947, as allowed by law, (d) advise Truman as to monetary and fiscal policy recommendations he should make to Congress, as requested by law. "It is not open to doubt that if the Congress is prepared, by a firm policy of taxing speculative profits, to remove the incentives that exist for the hoarding of goods and manipulation of prices, inflation can be substantially checked."

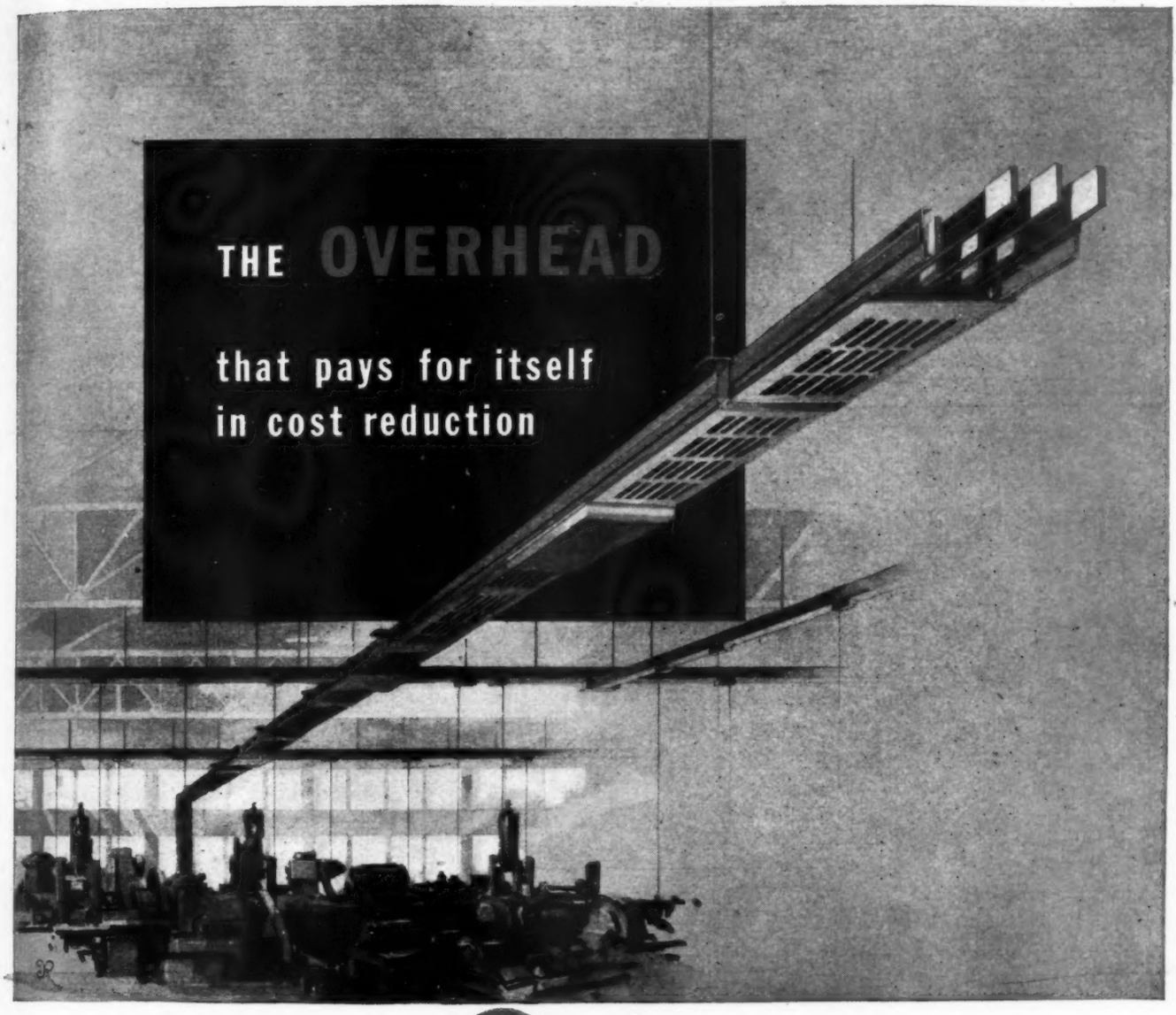
AFL—Took no action.

3. WAGE STABILIZATION

CIO—"Labor cannot continue to participate in a stabilization program in which wages are rolled back while at the same time increases in cost of living become a daily occurrence. A stabilization program that means curbs on wage increases and soaring price increases is not a stabilization program but a fraud. If wage stabilization is to continue, it must be revised to take account of the vast increase in prices and the increase in the cost of living that have occurred during the past 6 months. It must be made responsive to the runaway prices that now confront us. . . . Labor's acceptance of any form of wage stabilization is possible only if there is an immediate rollback of food prices and an administration of the present Price Control Act that will produce a maximum control of all prices."

AFL—The executive council did not discuss this subject, but AFL views were presented to the Price Decontrol Board. AFL is for restraint in wage demands and elimination of shortages, and believes full production is possible with price control.

Comment—We are in a watchful waiting period on the part of organized labor. Groundwork is being laid for wage demands after elections on the basis of increased labor costs. Ostensibly, union leaders are waiting to learn whether prices and the cost



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of living are rolled back to pre-June 30 levels, but they know there isn't a chance of it. The next few months will serve to determine what the size of the wage demand will be. UAW-CIO's filing a 60-day wage reopening notice with Chrysler on August 20, and the anonuncement of Walter Reuther that contracts will be reopened wherever permissible, has been declared by Reuther to be consistent with the CIO policy. Chrysler workers fixed the basis for the reopening on "drastic wage cuts which rising prices have imposed" on them.

4. PRODUCTION

CIO—American industry is raising the cry of "production" in an effort to multiply profits and conceal the fact that existing shortages are a result of a quest for higher profits. Employer groups falsely accuse workers of "not producing adequately" and seek additional profits by attacking wage and living standards through the speed-up and other devices. "The CIO repudiates any suggestion that the answer to our economic ills lies in the speed-up or in the widespread deterioration of terms and conditions of employment for which many employers in America are increasingly responsible."

AFL—"Our major need is volume of production. Our safety lies in getting through this period of transition with no major increases in costs or stoppages of production. . . . Wage earners can best stabilize their wage dollars by helping to increase volume of production, which can wipe out scarcities and the danger of runaway inflation. The other alternative—to pay for wage increases by raising prices—is no gain for workers, because living cost increases cancel wage gains."

Comment—Union leaders know that the next wage increases will have to come out of increased productivity if they are to have any real value, but CIO, it will be noted, refuses to face the issues as squarely as does AFL. CIO is still preaching that more wages can come out of profits. The next issue of its *Economic Outlook* will be devoted to the subject of profits. Walter Reuther, who staked his future as a union leader in the General Motors strike on the principle that wage increases can be paid without price increases, is now talking production and is concerned about its effect on pay envelopes. But he's thinking of maximum production only as it relates to full

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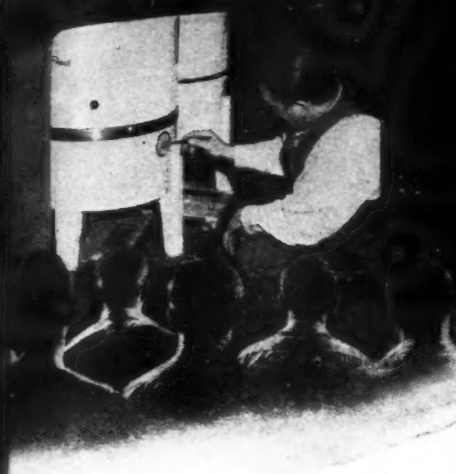

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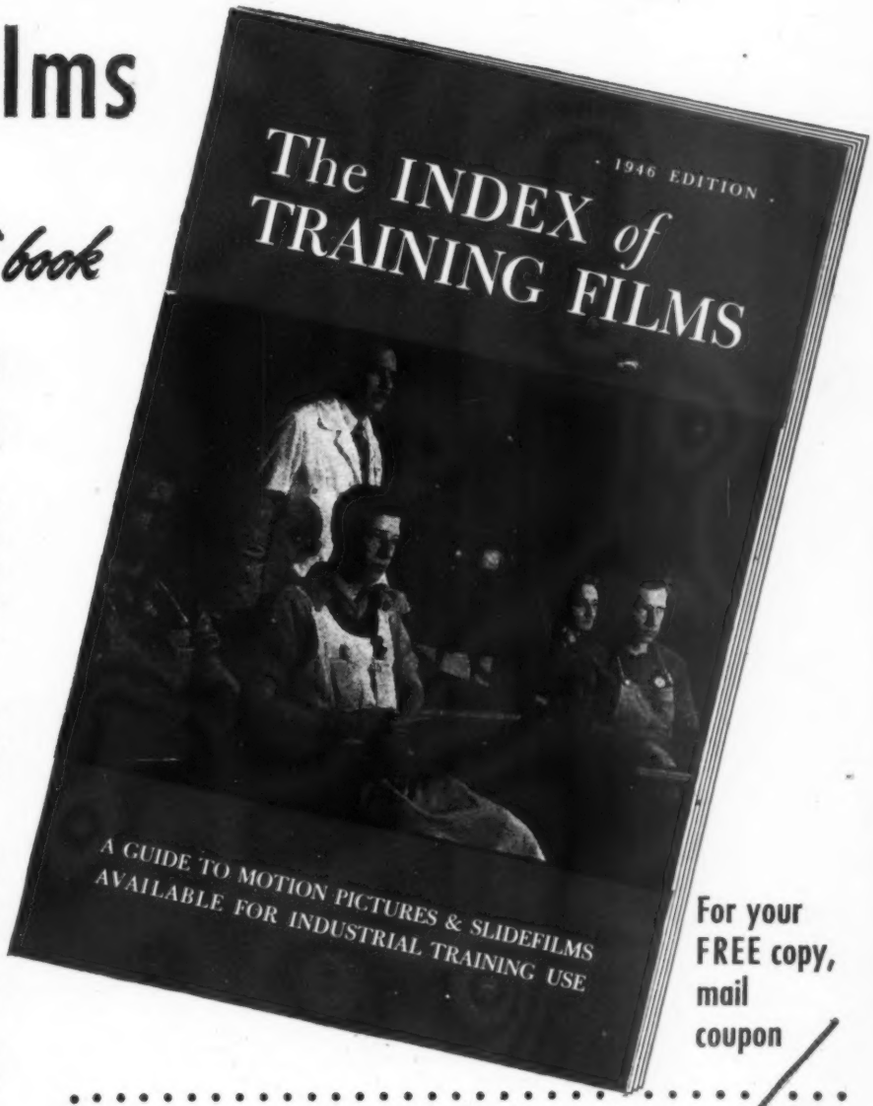

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employment, rather than in terms of increased productivity that could raise wages without price increases. He says: "There can be no real prosperity for America unless the entire community is rallied behind a campaign for higher wages, lower prices, and maximum production. There is no other road to full employment and full production."

5. POLITICAL ACTION

CIO—PAC has printed and tabulated the voting record of all members of Congress on 12 issues which it considered significant, for the purpose of "enlightening" its members in regard to "good" or "bad" legislators. Meetings are scheduled in 49 cities to stir up interest in the elections and to bring in more $1 contributions into a fund hoped to reach $1,000,000.

AFL—The 79th Congress made a "dismal record" and must be replaced by a Congress that will carry out the will of the people.

Comment—CIO-PAC as a political organization rivals the real political groups in those areas where a concentration of industrial workers gives it considerable strength. It spends $22,000 a week to operate its national headquarters in New York, employs considerable personnel, and issues pamphlets and circulars. It is a political machine in every sense of the word. Any number of factors may influence its position in regard to a candidate. LaFollette, "labor's best friend," lost support because of his isolationism and lack of admiration for Russia and Joe Stalin. PAC works closely with the Democratic party. The AFL, on the other hand, lacks any organization whatsoever, is spending no money, merely urging its members to "elect the friends of labor and defeat its enemies." Many AFL leaders openly back Republican candidates irrespective of their position on labor questions. In evaluating members of Congress, AFL ignored international questions and looked chiefly to their views on the minimum wage, veterans housing, and so-called anti-labor legislation. On only one thing do the AFL and PAC seem to agree politically: The 79th Congress could not have been any worse from a labor viewpoint.

Note—AFL membership was reported as 7,007,000 as of July 31, with a likelihood of 7,100,000 by August 31, end of fiscal year. AFL will hold its convention in Chicago, October 7. CIO in Atlantic City, November 18.